MOTOROLA

ECSD CUSTOMER SERVICE POLICY

DCS 1800 StarTac (clam)

MOTOROLA CONFIDENTIAL PROPRIETY

Document Approval ECSD European Customer Services Mgr	Date

ECSD Customer Service Policy

Purpose:

This document specifies the Customer Service requirements to provide after sales support for the DCS StarTac product.

Model Type:

TBC

Responsibility:

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Document Contents:

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1.0	Product Overview
2.0	Service Policy
3.0	Service Requirements
4.0	Distribution Overview
5.0	Quality Reporting and metrics

SECTION 1.0 - PRODUCT OVERVIEW

The DCS StarTac is a high tier product offering market leadership in terms of size, weight and features. The product will initially be positioned as a premium product targeted at the aspirational market segment. The DCS StarTac will have a similar form factor to the GSM variant, utilising the GSM housing supporting both 17 key formats for Co-branded product (Orange. Eplus, Bouygues) and the 19 key format for Motorola versions.

The key product features include:

* Smallest and lightest phone on the market.
* The first telephone in the Wearable category.
* Easy to use Personality MMI, enhanced for large display.
* Full feature set.
* Vibra Call (built in)
* Full size, retractable SIM card.
* Wide range of accessories included in package.

The product will be distributed through the principal European DCS Operator channels, namely Eplus, One2One, Orange and Bouygues.

SECTION 2.0 - SERVICE POLICY

2.1 Warranty:

Product will be sold with the standard 12 months warranty terms and conditions. Accidental damage misuse, retailers extended warranties will not be supported under warranty. Non warranty repairs will be available at agreed fixed repair prices.

Proof of purchase will be required to validate all warranty claims. Nb. Customer have the option to purchase additional warranty.

2.2 Out Of Box Failure Policy:

The standard OBF criteria will apply. Early life failurers to be returned to Manufacturing for root cause analysis, to guard against epidemic criteria. Manufacturing to bear the costs of early life failure.

2.3 Motorola branded product will be supported under a Low tier DCS Loaner programme. or alternative low cost service strategy. (To be agreed with European Customer Service Manager). The product may be serviced by appointed Motorola Service Hubs (level 2/3) and the Motorola HTC (level 4) at the discretion of the regional service managers.

2.4 Customer support (End user) will be available through dedicated Call Centres and In Country Help desks.

SECTION 3.0 - SERVICE REQUIRMENTS

3.1 Technical Training:

The GSM StarTac training will address this requirement.

3.2 Documentation:

Level 2 Service Documentation will be required to include:

Product Overview

DCS 1800 basic principles of operation

Technical Specifications

Testing and Phasing

Test Mode Features

Product Assembly / Disassembly

Level 2 Troubleshooting

Service Parts Lists

3.3 Service Parts:

A dedicated service parts list and prices (level 2) will be provided, in line with product launch. To be included in level 2 service manual. Service Transceiver and PCBs will be required to support field service.

3.4 Test Equipment and Tools:

Engineering to define a recommended list of unique service tools and test equipment,

SECTION 4.0 - DISTRIBUTION OVERVIEW

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4.1 Estimated launch date = Dec 96
Estimated launch volumes

4.2

Dec	2.5k
Jan97	2.5k
Feb	2.8k
Mar	2.8k
Apr	2.8k
May	2.8k
Jun-Aug	9.2k
Sep-Nov	9.2k

	34.6k

SECTION 5.0 -QUALITY REPORTING, METRICS

5.1 Field Return Rate:
The 1996 Projected Field Return Rates = TBA (Based on Engineering ALT Results)

5.2 Field product performance to be monitored using EPPRS system.
Monthly repair data can then be provided to Engineering which includes:
*% field return rate,
* paynter chart (failure by month of manufacture
* Repair Analysis
* Component Analysis (Top 10 Component failurers)

5.3 Field Returns Improvement Plan:
20% year on year (Q4-Q4) reduction on the number of field returns.

END.

NEW PRODUCT JUSTIFICATION REPORT

Product Variant	:	StarTAC 200 (Alex)
Product Description	:	Dual Slot StarTAC
PR No.	:	A28-32
Circulation	:	K Wilson, M Hickey, K Zaremski, J Lefevbre, S White, K Moon, A Johnston, M McGonigle, A Simspon, N Judge
Compiled by	:	*John Kennedy 14/07/98*

Summary

- StarTAC 200 (Alex) hardware build standard is very close to 85R (COSMO)
- Sales of 400-600K expected 1999. No ASP yet
- Ship acceptance Week 51 98
- Cost of EI NPI Project $787,426
- 5 Pilots planned
- 2 Major Risks Identified (Mitigation & Contingent Actions Identified)

1. Introduction

The aim of this report is to provide an executive summary and justification why StarTAC 200 (Alex) should be introduced to Easter Inch. This draft report has been to give an overview of the projected costs of the project and will be reviewed after the kick off meeting planned between EI and LV planned for week 30/31.

2. Background

2.1. Product Strategy

Market research has identified that end users are looking for easier ways to do financial transactions by "getting rid of the coins" and "reducing the number of cards".

Dual Slot StarTAC will be marketed as the first Smart Card handset allowing financial transactions. As an example, the Smart Card terminal will allow an "electronic purse" card to be reloaded over the air. This will offer a new relation between the phone and the consumer. Future stages will allow the end user to do direct financial transactions, ticketing and loyalty schemes over the air. In addition, the dual slot StarTAC will offer secure access to remote services, authentication. The Dual Slot StarTAC is to gain the business and consumer markets where state of the art technology influences decision purchase.

This is a unique product, the first of a new category of product that Motorola intends to dominate. This category is all about allowing Smart Cards to work in MOBILE environments (e.g. Smart Card ticked - Mobile Ticketing).

2.2. Product description

2.2.1. Physical Characteristics

The StarTAC 200 housing will be based on the existing StarTAC 85R. The opening flip will need to be modified with the top part of the flip being thicker to accommodate the small card reader. Maintaining the overall flip design therefore will enable the use of standard StarTAC batteries.

Most of the StarTAC 85R features are external identical i.e. lens, display, antenna, butt plug, side buttons, LED status indicator however the back housing although being identical to the StarTAC 85R with the exception of the circled M which will be in gold as per the StarTAC 130.

The keypad will be specific. The MR key will be replaced by a circled M key and the colour of the marking changed to white or gold.

The interior escutcheon below the speaker will differentiate StarTAC 200 from other StarTAC platforms. The name or number is under elaboration: StarTAC Smart, like what was done for StarTAC voice. If this was the chosen name, then the circled M key could be replaced by a key with "Smart" written on it. The number could also be a possibility to remind the dual slot capability (StarTAC 200).

2.3. Performance Characteristics

StarTAC 200 will be the worlds first mobile phone to simultaneously accept two SIM cards. One small SIM format below the battery and one large SIM (ISO) like the StarTAC 85R. This is achieved by using the small sim card reader design presently realised on ZAP and updating the StarTAC 85R PCB to accommodate the new devices.

The circuitry on the flip flex has to be updated to interface the electronics to the card reader.

Most of the other functional feature and improvements required for realising financial transactions will be achieved through software.

General overall StarTAC 85R performance is expected.

2.4. New Technologies

None.

2.5. Expected Volumes & ASP

Volumes are expected to be anywhere between 400-600k through 1999. Barclay card (UK) have shown most interest and it is believed that the ramp will start off slow in Q1 picking up Q2 with the majority of product being shipped in Q3, Q4.

	Q1	Q2	Q3	Q4
Volume	50K	100K	150K	150K

The first target markets are in the process of being identified. UK, Belgium, Portugal and Hong Kong are for the moment the most active countries liable of supporting Smartcard infrastructure.

This handset will be tiered above the existing StarTAC 85R. The premium price will be justified by the world's first Smartcard compatible handset. At first, this product will be bundled with airtime, thus giving a subsidized package price. The tiering will therefore be high although thought is being given to a low tier product for pre-pay applications.

No ASP available at the present time.

3. EI Proposal

3.1. Approach to New Product Introduction

In technology terms, we do not foresee a problem with the introduction of this new product to EI. The product is primarily a StarTAC 85RR with minimal hardware modifications :

The following assumptions/strategies have been made :

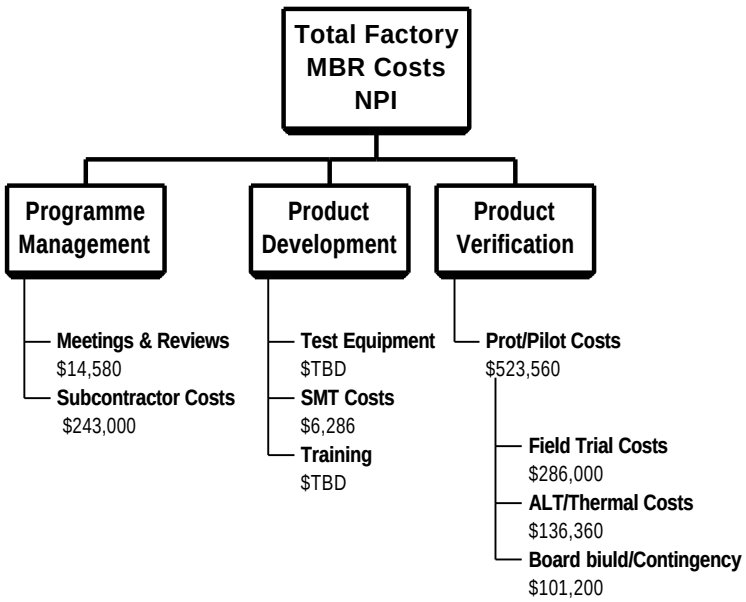
- No additional test equipment will be procured. It is perceived at this moment in time that we do not have to procure additional test heads/fixtures and will be able to modify (if required) existing StarTAC 85RR test fixtures with a minimum of effort. However the proposed functionality needs to be confirmed before a full assessment can be made.
- Tooling will be secured locally for the production ramp with material being supplied on allocation from Libertyville during the pilot phase of the project.
- Hardware can be produced independent of the final software version being available. We must ensure that base functionality software is generated that will allow the pilot runs to be board/final tested to confirm the hardware is operational. Final versions software can then be flexed in LV if it is not available at the time of the pilot.

3.2. Estimated Project costs (to end of year)

The estimated spend to the end of financial year 1998 will be $787,426.

3.2.1. Breakdown

StarTAC 200 (Alex) MBR Breakdown



3.2.1.1. Meetings & Reviews

A limited amount of meetings & reviews have been planned. However, with the product knowledge which EI already has on StarTAC 85R this has been kept to a minimum.

3.2.1.2. Subcontractor Costs

The majority of the costs are for flip and flex tooling. The biggest field issue presently with StarTAC is related to the display assy. This part is presently manufactured by a subcontractor but StarTAC 200 may have to invest additional funds to resolve the current issue.

3.2.1.3.Test Equipment Costs

This cost is assumed to be nil. However, the test strategy should be discussed and the cost for test equipment reviewed at the kick off meeting.

3.2.1.4. SMT Costs

This cost is associated with SMT support costs for new stencils and vac blocks. It includes any risk mitigation/contingency costs which have been identified.

3.2.1.5.Training Costs

This cost is assumed to be nil (EI have a wealth of StarTAC 85RR knowledge).

3.2.1.6.Proto/Pilot Costs

The majority of the NPI spend. An assumption made is that the yield expected from the earlier pilots will produce material scrap (which has been accounted for in the estimate). The expected yield improves the closer the programme moves towards the ship acceptance milestone and therefore the scrap estimate reduces.

3.2.2. Detailed Estimate & Spend

Task description	Aug	Sep	Oct	Nov	Dec	Total
Proto/Pilot/Field Trial/ALT/Thermal Costs						
Proto I build - 100 pieces @ yield 60%	$33,200					$33,200
Proto II build @ 250 pieces @ yield 70%		$72,360				$72,360
Proto III build - 1000 Units (field trial) @ 75% yield		$143,000	$143,000			$286,000
Contingency build 250 pcs @ 75% yield			$68,000			$68,000
Final Proto Build @ 250 Pieces @ 80% Yield				$64,000		$64,000
Total (US $)	$33,200	$215,360	$211,000	$64,000		$523,560
Subcontractor Costs						
Tooling Charge for flip			£130,000			£130,000
Tooling Charge for flex			£20,000			£20,000
Total (UK £)	£	£	£150,000	£	£	£150,000
Total (US $)	$	$	$243,000	$	$	$243,000
SMT Costs						
Stencils	£960		£960	£960		£2,880
Vac Blocks	£500		£500			£1,000
Total (UK £)	£1,460	£	£1,460	£960	£	£3,880
Total (US $)	$2,365	$	$2,365	$1,555	$	$6,286
Meetings & Reviews						
Programme Review @ LV	£6,000		£3,000			£9,000
Total (UK £)	£6,000	£	£3,000	£		£9,000
Total (US $)	$9,720	$	$4,860	$		$14,580
Grand Total (US $)	**$288,285**	**$215,360**	**$461,225**	**$65,555**	**$**	**$787,426**
Grand Total (UK £)	**£178,737**	**£133,523**	**£285,960**	**£40,644**	**£**	**£488,204**

3.3. Proposed Programme Plan

The top level gantt chart is identified in section 3.3.3.

The plan shows that we have planned 2 ALT Submissions in an attempt to mitigate programme risk in delaying the date for Product ship acceptance which is planned for week 51, 98.

3.3.1. Pilot Plans

Total number of pilots planned : 1 board pilot and 4 phone pilots.
Total number of phones generated : 1750 Phones (100 boards)

All pilots have been planned to run on the EI factory proto line A1.1, however additional activities will be planned to run from an existing GSM production line should the risk highlighted in section 3.4 be realised.

3.3.2. Proposed Production Ramp

The production ramp will initially be from one of the smaller StarTAC production lines (B2.3). The factory (by Q1) should have migrated to a 4th shift pattern making the line (B2.3) capable of producing the quantities identified for Q1.

Depending on the full StarTAC mix in Q2 going forward and number of options are open, however the most cost effective solution will be reviewed after the initial kick-off meeting to maximise profitability.

Production lines available for StarTAC

Line Configuration	SAR
B3.2	1152
B2.3	1152
B2.2	1152
B1.2/3.3	1517

3.3.3. Detailed Programme Plan

3.4. Programme Risk

An initial risk assessment has been conducted and 2 major programme risk identified

- PREVIOUS STARTAC PROGRAMMES (COSMO & KRUNCH) HAVE NOT BEEN FREE FROM DESIGN ISSUES WHEN UNITS HAVE BEEN SUBMITTED TO ALT. ALTHOUGH BASED ON COSMO, PROBLEMS COULD BE INTRODUCED CAUSING THE ALT SUBMISSION TO FAIL OR FQA THERMAL GATE ISSUES TO BE IDENTIFIED.

- EI LEAD SITE ROLE HAS DRAMATICALLY INCREASE IN THE LAST 2/3 WEEKS. NEW PRODUCTS WHICH HAVE TO SHARE THE PROTO LINE ARE LEAP, KRAMER AND ALEX. THE PRIOIRITY ON BOTH LEAP & KRAMER COULD BE HIGHER THAN ALEX AND ANY DELAYS/NEW REQUIREMENTS FROM OTHER PROJECTS MAY 'STEAL' ALREADY BOOKED ALEX TIME ON THE PROTO LINE

2 risk mitigation activities have been identified and planned to contain the risk identified above :

- An additional ALT Pilot has been included in the programme plan ensuring that problems identified in the first submission are corrected satisfactorily for Ship Acceptance.

- One of the production GSM lines will be configured 'dual set' to ensure that a pilot run could be performed if the Proto Line were not available

1 contingent activity has also been included in the programme plan to contain some of the other risks identified

- A additional pilot has been scheduled so if any design iteration issues occur we can run another pilot to confirm the changes

3.4.1. Initial Risk Assessment

	RISK INFORMATION		MILESTONE	DATE	RMF EXISTS	PROB	IMPACT STATUS		
No.	TYPE	NAME	AFFECTED	RAISED	Y/N	1 ... 9	H	M	L
1	P	DESIGN ISSUES CAUSING ALT FAILURES/FQA T GATE ISSUES	2.2.4	10/07/98	Y	6	✓		
2	T	SOFTWARE PROGRAMMING DELAYS IMPACT PILOT PRODUCTION DELAYS	2.1.4/2.1.6	10/07/98	Y	7		✓	
3	P	OTHER NEW PRODUCTS (KRAMER, LEAP) DELAYS IMPACT PILOT PROGRAMME	2.1.1/2.1.2/2.1.4 2.1.5/2.1.6	10/07/98	Y	7	✓		
4	P	TOOL PROCUREMENT PROCESS IMPACTS JANUARY RAMP	2.3.5	10/07/98	N	5		✓	
5	T	FIELD TRAILS FEEDBACK/DESIGN ISSUES REQUIRES ANOTHER DESIGN ITERRATION	2.1.5	10/07/98	Y	7		✓	
6	C	PROJECT BUDGET IS EXCEEDED	N/A	10/07/98	N	6		✓	
7	P	ROLLED YIELD FOR SHIP ACCEPTANCE IS TO LOW	2.3.1	10/07/98	N	4		✓	
8									
9									

MOTOROLA

PRODUCT DESCRIPTION
Full Document

DCS 1800 Clam RAE

Project No.: A29-01

Version 1.2

Ruchi Mangalik

Jan 6, 1997

MOTOROLA CONFIDENTIAL PROPRIETARY

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	Finance	
Bernie McGill		
	Distribution	

REVISION HISTORY

Version	Date	Name	Reason
1.0	09-Oct-96	Mary Jo Schavitz	Initial release.
1.1	27-Nov-96	Mary Jo Schavitz	Deletion of SIM lock requirement for Malaysia.
1.2	1-6-97	Ruchi Mangalik	Add GC requirements

1. INTRODUCTION

This product description describes the DCS1800 Clam RAE product for the Greater China South Asia region. This product description makes reference to the latest Asia/Pacific GSM Clam RAE product description, version 1.1, issued by Ruchi Mangalik. Features that are different for DCS 1800 are documented here.

1.1 Product Strategy

As GSM Clam RAE PD. The DCS StarTAC is part of the Signature Series and thus it must follow the Signature guidelines. There no cosmetic differences between the DCS StarTAC and GSM StarTAC because our strategy is to be indifferent and support all technologies. We do not want to make the statement that one technology is more important than the other.

1.2 Target Markets

The countries of Malaysia, Singapore, Thailand, and Hong Kong.

1.3 Distribution Strategy

In keeping with the Global Distribution Strategy, distribution of DCS Clam RAE will be limited to channels that enhance the premium positioning that this product reflects. A distribution strategy for each country must be developed before the DCS Clam RAE can be introduced into that country. Precise distribution plans will be released closer to the launch date (expected to be January 1997).

2. PRODUCT DESCRIPTION

2.1 Physical Characteristics

- Housing
  The GCSA DCS1800 Clam RAE will use the same housing as the Motorola branded Europe DCS1800 19 key Clam RAE. The model number for the Motorola branded Europe DCS1800 19 key Clam RAE is S5993ABB.

- Batteries
  The Auxiliary battery feature must be implemented for the GCSA DCS Clam RAE model.

- Colour
  Initially, all models will use black plastics. However, options for colour will also be investigated. This is dependant on the core group.

- SIM Card
  As GSM Clam RAE PD.

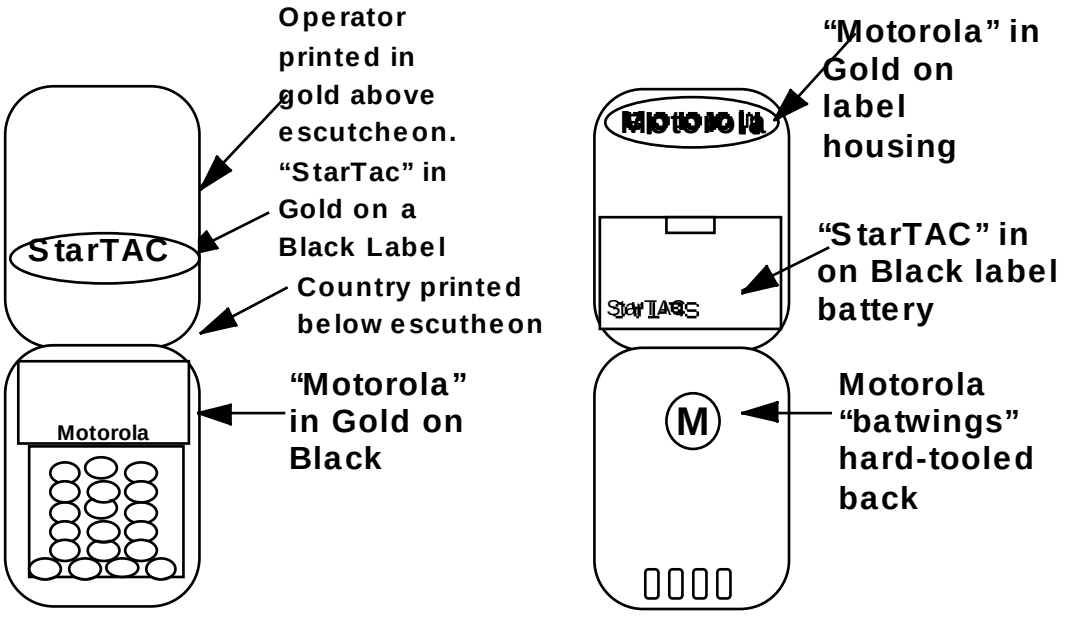
- Display & Indicators
  As GSM Clam RAE PD.

- Antenna
  The DCS1800 Clam RAE will incorporate a retractable DCS1800 antenna which stands vertical when the product is in the holster. The antenna must not interfere with the opening or closing of the Clam, either when extended or retracted.

- Lens
  Identical to the Motorola branded Europe DCS1800 19 key Clam RAE.

- Escutcheons
  Identical to the Motorola branded Europe DCS1800 19 key Clam RAE.

- Keypad
  Identical to the Motorola branded Europe DCS1800 19 key Clam RAE. The alpha numeric keys will conform to ITU-T standard E.161.


Operator printed in gold above escutcheon.
"StarTac" in Gold on a Black Label
Country printed below escutheon
"Motorola" in Gold on Black
StarTAC
Motorola
"Motorola" in Gold on label housing
"StarTAC" in on Black label battery
Motorola "batwings" hard-tooled back
M

Inside View **Outside View**

As shown above, for South Asia, the country name will be tampoed below the inside escutheon for trans-shipment purposes. For Hong Kong, the operator name will be tampoed above the escutheon and no country name.

2.2 Key/Unique Features

The DCS1800 Clam RAE will be the first DCS 'wearable' Motorola product in the GCSA region. It will lead the range in features, size and weight. Initially, it will be positioned as an aspirational product, rather that a mainstream volume product.

Features that will differentiate this product from those of our competitors are:

- Smallest, lightest phone on the market
- Aspirational values
- Auxiliary battery concept, giving unlimited talk and standby time
- Easy to use Personality™ MMI, enhanced for large display
- Full feature set
- VibraCall™, built in, not bolted on
- Full size, retractable SIM card
- Wide range of accessories included in package

2.3 Performance Characteristics

2.3.1 Transceiver Performance

Initial estimates of DCS1800 Clam RAE performance with standard batteries are shown below:

Volume (cc)	Weight (gm)	Talk Time (Mins)	Standby Time (hours)	with Battery
80	81	-	-	Standard Transceiver only
<100	<100	70-90	20-25	LiIon 350 mAh (SNN4875 w/Noryl transceiver
100	105	70-90	20-25	LiIon 350 mAh (SNN4875) w/standard transceiver
100	110	120-140	30-38	LiIon 500 mAh (SNN4667)
109	126	210-280	60-70	LiIon 900 mAh (SNN4668)
109	125	110-140	30-35	NiMH 500 mAh (SNN4669)

Initial estimates of DCS1800 Clam RAE performance with auxiliary battery are shown below; weights and volumes are additional to the core unit (i.e. w/LiIon 500 mAh battery)

Volume (cc)	Weight (gm)	Talk Time (Mins)	Standby Time (hours)	with Battery
40	54	200-260	55-65	LiIon 900 mAh (SNN4867)

2.3.2 Charge Times

Maximum acceptable charge times are shown below.

Battery	Charge time with E.P.+ Standard Travel Charger to 95% charge
NiMH batteries	70 minutes
LiIon batteries	2 1/2 hours

The unit must feautre seamless power transitions with travel charger and cigarette lighter adapter.

2.3.3 Compatible Battery Technology

As GSM Clam RAE PD.

2.3.4 Data Compatibility

As GSM Clam RAE PD.

3. EXPECTED LIFETIME

RAE is a new product platform which will evolve over time into various different product platforms. It is anticipated the DCS 1800 RAE family will last beyond the year 2000. During this time model variations will be introduced.

4. SOFTWARE AND MMI DESCRIPTION

Functional descriptions for each software and MMI feature are defined in the Europe DCS 6700 and StarTAC Software Requirements Document, version 0.2. The StarTAC will be compatible with CPHS version 3.1.

5. MODELS/VERSIONS

5.1 New Sales Models

Only the GCSA and the Motorola branded Europe models are listed below: Malaysia will not require any SIM lock mechanism.

Model Number	Brand	Description
S6373ABB	**Motorola (for Malaysia)**	**Poly Black housing; Non-SIM-locked.**

S6374ABB	**Motorola (for Singapore)**	**Poly Black housing; Non-SIM-locked.**
S6375ABB	**Motorola (for Thailand)**	**Poly Black housing; Non-SIM-locked.**
S6691ABB	**Motorola (for Hong Kong)**	**Poly Black housing; Non-SIM-locked.**
S6691ABB	**Motorola (for HK Peoples Telephone)**	**Poly Black housing; Non-SIM-locked.**
S6692ABB	**Motorola (for HK New World PCS)**	**Poly Black housing; Non-SIM-locked.**
S6693ABB	**Motorola (for HK Manderin Comm)**	**Poly Black housing; Non-SIM-locked.**
S6694ABB	**Motorola (for HK Hutchison)**	**Poly Black housing; Non-SIM-locked.**
S6695ABB	**Motorola (for HK Pacific Link)**	**Poly Black housing; Non-SIM-locked.**
S6696ABB	**Motorola (for HK P Plus)**	**Poly Black housing; Non-SIM-locked.**
S5993 ABB	Motorola (standard Europe)	Black housing; Non-SIM-locked; fully featured. (std. package)

5.1.1 Package Contents

The package contents for all packages contain the following

- SWF transceiver
- 500 mAh Li Ion Main battery SNN4667
- 900 mAh Li Ion Aux Battery SNN4867
- EP power supply (SPN4278)
- Holster (SYN5378)
- Country plug (US/UK/Euro)
- User Manual (68P09395A63)

5.1.2 Flexing Information

FEATURE	DEFAULT SETTING
SIM Lock	None

Home Zone	None
Data	9600 Baud
Earpiece volume	Maximum
Ringer	Standard Tone
Ringer Volume	High
Extended Menus	Off except for Hong Kong
Language	Automatic (English)
Keypad Tone	Normal Tones
Phone Lock	Off
Phone Lock Number	1234
Security Code	000000
Battery Saving Mode	On
Wakeup graphic	Motorola DCS StarTAC
Network Selection	Automatic
Meter During Call	Off (Hong Kong will have InComing call timer ON)
User Definable Quick Access	Yes
Key Answer Only	Off

5.2 Service Requirements

The following items are required for service:

- a Service Transceiver with IMEI, packed without any accessories/manual/etc.
- a Service Printed Circuit Board (PCB), fully phased and tested, with an IMEI.

5.3 Manual Requirements

Manual will be identical to the Motorola branded Europe DCS1800 19 key Clam RAE.

6. PACKAGING/LABELLING REQUIREMENTS

Transceiver labels

The following standard layout should be used for all models:

Note: All models should have the MC² 9600 baud logo.

Transceiver Label
40mm x 20 mm

Type: MP1-1C11	DCS 1800	Encrypted IMEI
MSN: Human Readable	S1234ABCD	
CEPT DCS IMEI: Human Readable	BABT	
Made in USA by Motorola	Logo	
IMEI: Bar Code		
CE Logo	MC^2 Logo	

Box labels

The following standard layout should be used for all models:

Box Label
101.6mm x 63.5mm

<table>
<tr><td colspan="2">Made in the USA
MOTOROLA DCS StarTAC</td><td>Recycle Logo
CE Logo</td></tr>
<tr><td colspan="2">Model Number: Human Readable
Model Number: Bar Code

MSN: Human Readable
MSN: Bar Code

IMEI: Human Readable
IMEI: Bar Code

Sequence Number: Human Readable
Sequence Number: Bar Code</td><td>T-Option:
Bar Code
Human Readable

EAN
Bar Code</td></tr>
</table>

7. PRODUCT NAME/MARKET NAME

The market name for this product is the DCS StarTAC™.

8. TYPE APPROVAL

Full Type Approval must be obtained for the DCS 1800 StarTAC before final ship authorisation. Both internal and field operator testing must be conducted in the locations where this phone is to be sold before final ship authorisation, also.

9. ACCESSORIES & COMPATIBILITY

9.1 Current

Part Number	Name	Compatibility Notes
SNN4875	Slim Main 350 mAh LiIon Battery	
SNN4667	Slim Main 500 mAh LiIon Battery	
SNN4668	Standard Main LiIon 900 mAh Battery	
SNN4867	Slim AUX LiIon 900 mAh Battery	
SPN4278	Power Adapter	
SYN4656	UK Adapter Plug	
SYN4655	European Adapter Plug	
SPN4435	Rapid Desktop Charger	
SYN4241	Cigarette Lighter Adapter	
SYN5378	Standard Belt Holster	
SYN4653	Slimline Belt Holster	
SYN5621	Holster (Aux) Norvl	
SYN5622	Slimline Holster (Non-Aux) Norvl	
S5338A	Hands Free Car Kit	
SYN4898	Leather Pouch-Black	
SYN4899	Leather Purse PAK-Black	
S6319	Cellect™ 1+	
S6320	Cellect™ 2 for Australia	
S5702A	PC Card 9600 Baud Data Interface	

9.2 Planned

Part Number	Name	Compatibility Notes
SNN4577	Auxiliary: Extra Capacity 1000mAh NiMH	
SNN4669	Standard 500 mAh NiMH	
TBD	Double Stacked 1800 Lithium Ion battery	
SNN4609	LiIon 1400 mAh	

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DRAFT

Core Product Description

Alex

Dual Slot StarTAC

GSM900

Stage I

Project Nos.

Alex - Dual Slot StarTAC A28-32

Alex – Dual Slot StarTAC (phase 2) requested

Issue 2.0

Note: This document is also available on Lotus Notes at the following locati:
- EMEA Product Description
- - Alex Dual Slot StarTAC
- - - Section 8. Appendix
- - - - Alex PD v1.0.doc (An MS Word Attachment)

Guy Lanrezac

November 21, 1998

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REVISION HISTORY

Version	Date	Name	Reason
Issue 1.0	27-Aug-98	Guy Lanrezac	Initial release of 'Alex' Product Description.
Issue 1.1		Guy Lanrezac	Insertion of Part Numbers
Issue 1.2	18-Sep-98	Guy Lanrezac	Update on Performance figures
			Update on Software Feature Set (ZAP refresh)
Issue 2.0	23-Sep-98	Guy Lanrezac	Introduction of Phase 2

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1 INTRODUCTION

This document describes the new generation of dual slot phones. Dual Slot StarTAC will be available in GSM Phase 2 in the GSM 900 band. This same product could be made available in the GSM 1800 band or GSM 1900 band. The market requirements goal for ship acceptance of the GSM 900 Alex is Q41998

In Q1 1999, Alex Phase 2 will replace Alex Phase 1. The main enhancements of this version will be the support of USSD as a data bearer allowing faster transactions and the support of the hands-free accessory kit – essential for the Asian Market.

1.1 Product Strategy

Dual Slot StarTAC will be differentiated from the key competitors by the following advantages:

- Best in class form factor for a smart card capable phone (weight and volume)
- Best smart card storage handling

Dual Slot StarTAC will be differentiated from the key competitors by the following advanced operator features:

- Third party Smart Card capable (over & above SIM)
- SIM Tool Kit Class 2 **& Class 3 (phase 2)**
- Dedicated Key to SIM Tool Kit menu
- Dual Slot SIM Tool Kit commands (standardized in SMG9)

Dual Slot StarTAC will be differentiated from the key competitors by the following advanced features:

- Ergonomic styling
- Large graphic display
- Vibracall
- Easy access to Smart Card applications
- **Colours & Soft Touch feel (being investigated for phase 2)**

Market research has identified that end users are looking for easier ways to do financial transactions by "getting rid of the coins" and "reducing the number of cards".

Dual Slot StarTAC will be marketed as the first Smart Card handset allowing financial transactions. As an example, the Smart Card terminal will allow an "electronic purse" card to be reloaded over the air. This will offer a new relation between the phone and the consumer. Future stages will allow the end user to do direct financial transactions, ticketing and loyalty schemes over the air. In addition, the dual slot StarTAC will offer secure access to remote

services, authentication. The Dual Slot StarTAC is to gain the business and consumer markets where state of the art technology influences decision purchase.

1.1 Target Customers

Alex will be defined at mid to high tier consumers seeking premium products with state of the art technology. These consumers will typically be international credit card users (Amex, Premier or Gold). The purchase decision will be motivated by the incredible form factor and the world's first Smartcard compatible handset. They will by definition already value the benefits of smart cards and the benefits of mobile telephony.

Client Target:

- Alex will be focused on key and influential targets that will help Motorola to:
- Create and support this new product category,
- Champion standards internationally,
- Establish security guidelines (processes),
- Champion Motorola's certification and type approval through VISA, Mastercard & Banksys etc... institutions.

1.2 Product Tiering Strategy

This handset will be tiered above the existing StarTAC 85. The premium price will be justified by the improvements on the world's first Smartcard compatible handset. At first, this product will be bundled with airtime, thus giving a subsidized package price.

1.3 Target Markets

The first target markets are in the process of being identified. UK, France, Belgium, Portugal, Singapore and Hong Kong are for the moment the most active countries liable of supporting Smartcard infrastructure.

1.4 Distribution Strategy

At first dual slot StarTAC will be packaged with an operator SIM card meaning that the distribution of the dual slot StarTAC will be tightly linked to both GSM subscription & smart card services issuers. This will drive the following issues: dual phone / package-branding, promotion, distribution, and customer care. Direct mailing through the Value Added Service Providers (Smart Card issuer) will be heavily used.

1.5 Advertising

Alex is the next step of Motorola's leading technology in mobile handsets. While conserving the market's most wearable phone form factor, Motorola offers the world first Smartcard handset that combines traditional GSM digital cellular phone features with

electronic cash services - paving the way for mobile ATM, remote ticketing, pay-as-you-use telephony and on-line payment transactions using smart cards.

It is this smart card capability that transforms it into a new generation of cellular phone. One capable of converging remote connectivity with electronic cash and service transactions. No more queuing for currency, travel tickets or payment - in the future, simply insert the relevant smart card into the Motorola Smartcard phone, then dial-up, book and pay for goods and services, access bank account details and even download money onto your smart cash card.

Alex is the first secure device that allows everyone from telecoms operators and smart card manufacturers to banks and financial institutions, to unlock the potential of the smart card. It creates a platform for the future development of mobile e-purse, remote electronic commerce and numerous other wireless services.

As well as generating new profitable value added services for the industry, the phones will also create new levels of convenience for users - a new cashless society where they can instantly access electronic cash and services at any time, wherever they are.

2 PRODUCT DESCRIPTION

2.1 Physical Characteristics

2.1.1 Housing

Main housings:
Alex housing will be based on the existing StarTAC 85. The opening flip will need to be modified. The top part of the flip will be thicker to accommodate the small card reader. This will enable the use of standard StarTAC batteries

- **Escutcheon:**
  The escutcheons will be identical to the StarTAC 85 with the exception of the one below the speaker (flip open) which will be 25% bigger. The reason to increase the size of that escutcheon is to help multi party co-branding. All smart card schemes will have 3 major players: Motorola, the GSM operator and the scheme owner (financial or transportation institution).
- **Colors:**
  Two new colors will be investigated. Escutcheons may be changed to compliment these new colors
- **Texture:**
  The texture will be similar to the existing StarTAC 85. .**Soft Touch is being investigated for Phase 2.**

2.1.2 Display

The Alex display will be identical to the StarTAC 85. The display will be a 96 x 32 pixel grid display with two rows of icons (top and bottom). Icons will include signal strength, battery charge indicator, in service, roaming, and SMS notification.

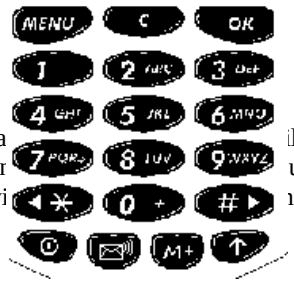
2.1.3 Lens

The Alex lens will be identical to the StarTAC 85 display. The lens will have a black border with gold Motorola printing centered at the top of the lens.

2.1.4 Keypad

The Alex keypad will be specific. The MR key will be replaced by the call voicemail key. The color of the marking will be near white. This keypad has already been defined for StarTAC 150 (Georges).

Side buttons: Three side buttons will be utilized, similar to the existing StarTAC 85 and 70. The top and bottom buttons will control volume control and phone book scrolling, while the middle "smart" button will access the phonebook and place the call if held.



2.1.5 LED Indicators

Status LED Indica ilized on the back, upper right side of the phone. Conver used: green will mean in service, red will mean no servi ı service roaming.

2.1.6 Connectors

Alex will support connectivity to peripheral devices through a Rae style connector. Through this connector, Alex will support rapid charging, CLA device, data cable

2.1.7 SIM Card

Alex will be the world's first mobile phone to simultaneously accept two SIM cards. One small SIM format below the battery and one large SIM (ISO) like the StarTAC 85.

2.1.8 Antenna

The antenna will support 900 mHz frequencies. Alex will ship with a fixed, black antenna.

2.2 Performance Characteristics

2.2.1 Radio Performance

The following targets should be met for free space radio performance of the Alex platform:

Fixed antenna: better than 8700 antenna up

2.2.2 Battery Performance

Below are estimates for talk and standby times for Alex. These figures must be verified by Engineering before promotional material is published.

Volume (cc)	Weight (gr)	Dimensions (mm)	Talk Time* (mins)	Standby Time* (hours)	with Battery
105	113	98.3x57.3x26	110-150 min	40-50 hrs	Slim 500 mAh LiIon
115	128	98.3 x 57.3 x 30.6	110-150 min	40-50 hrs	Slim 500 mAh NiMH
114	130	98.3 x 57.3 x 30.6	200-270 min	70-95 hrs	Extra Capacity 900 mAh LiIon
N/A	N/A	N/A	180-240 min	65-85 hrs	Slim Auxiliary 900 mAh LiIon
150	167.5	99.9 x 57.3 x 43.7	280-390 min	95-130 hrs	Slim Auxiliary 900 mAh LiIon + 500 mAh LiIon Main
154.4	184	99.9 x 57.3 x 48.3	380-500 min	130-175 hrs	Slim Auxiliary 900 mAh LiIon + 900 mAh LiIon Main

* All battery performance times are approximate and will vary depending on network configuration, band and status, and the functions selected. Times are quoted as a range from DRX=2 to DRX=9. Support of DTX mode is dependent on network support and may not be available in all areas.

2.2.3 Battery Charge Times

Maximum acceptable charge times are shown below.

Battery	Charge time with E.P. Standard Travel Charger to 95% charge	Charge time with E.P. Desktop Charger to 90% charge
Slim 500 mAh LiIon	2.5 hours	
Slim 500 mAh NiMH		
Extra Capacity 900 mAh LiIon	2.5 hours	
Slim Auxiliary 900 mAh LiIon	2.5 hours	
Slim Auxiliary 900 mAh LiIon + 500 mAh LiIon Main	5 hours	

Battery	Charge time with E.P. Standard Travel Charger to 95% charge	Charge time with E.P. Desktop Charger to 90% charge
Slim Auxiliary 900 mAh LiIon + 900 mAh LiIon Main	5 hours	

2.2.4 Compatible Battery Technology

Alex will be compatible with all existing RAE style batteries, including LiIon and NiMH technologies

2.2.5 Data Compatibility

Alex will be able to send and receive data at 9600 bps with a CELLect card like the StarTAC 85. Note that Alex Phase 2 will work with the SmartCell + Soft modem

3 TIMING, DEMAND AND FINANCIAL TARGETS

3.1 Introduction

The Dual Slot StarTAC ship accept date is targeted for January 99. Phase 2 is expected for S2 ’99.

3.2 Forecast

Region	Operator	Scheme type & owner	Motorola Part Number	First shipment date	Trials volume	Target Forecast for 1999
Alex Phase 1						
EMEA UK	Cellnet	Mobile ATM Barclaycard	SE0420AB1B4	Q1 ‘99	1000	25’000
EMEA France	France Telecom	On Line Payment	TBD	Q1 ‘99	100	25’000
Alex Phase 2						
ASIA Hong Kong	Smartone	Mobile ATM TBD		Q2 ‘99	TBD	25’000
ASIA Singapore	Mobile 1	Mobile ATM Nets		Q2 ‘99	TBD	50’000

3.3 Expected Lifetime

The Alex Phase 1 platform is expected to ship into the market until phase 2 completely replaces it in Q3 ’99.

4 SOFTWARE AND MMI DESCRIPTION

Alex will use the Personality™ II interface. It will take the complete feature set of the StarTAC 85, plus the ZAP refresh features listed below.

Tracking Number	Description	Status for launch	Priority
0151	SMS-MT delete first	Committed	1
0152	DHFA enhancement package	Committed	1
0127	GSM voicemail support	Committed	1
0145	AoC Charging improvements	Committed	2
0024	Auto-Read MT-SMS	Committed	1
0042	Seamless Power A (External power sources)	Committed	1
0198	Smart Key (place/answer calls with Smart Key). Note: answer call with Smart Key is requested for phase 2, once Alex phase 2 supports accessory headset	Committed	1
0165	Stop Call Alert with Volume Keys	Committed	1
0025	Improved Call Divert	Committed	1
0002	Phase II MMIC/MMIS	Committed	1
0003	Phase II SMS	Committed	1
0043	Seamless Power B (DHFA)	Committed	1
0131	Delayed Power On & Off flex control	Committed	1
0004	IP-SMS management via PC	Committed	1
0137	IP-Phonebook	Committed	1
0082	Multiparty Calling	Committed	1
0166	Call Transfer	Committed	1
0156	Service Provider name	Committed	1
N/A	Support for DSP car kits	Committed	1
N/A	Invalid battery feature	Committed	1
N/A	Erase Last 10 numbers when SIM is removed	Committed	1
N/A	Asian SMS	Committed	1
N/A	SIM Tool Kit unicode	Committed	1
0039	6 x SIM interface	Committed	1
N/A	16K SIM	Not committed	2
0155	Increase SIM ADN locations from 155- 255	Committed	1
?*	Increase SIM SMS locations from 35 to 75	Committed	1
0115	SMS Delete all messages option	Committed	1
0023	MO-SMS reply to MT-SMS	Committed	1
0014	SMS Phone book access	Committed	1
?*	Change CLI lookup to use 8 digits	Committed	1
?*	Conference call / call transfer improvement	Committed	1
	New Quick Access items		

Tracking Number	Description	Status for launch	Priority
	Show Date	Committed	1
	Show Credit Remaining	Committed	1
	SIM selection	Not requested	1
	Eastern European Language	Committed	1
	EFR	Committed	1
	Asian Subsidy Lock Enhancement	Committed	1
	SMS unique Alert Tone	Committed	1
	GSM phase 2 USSD		1
	Class 3 SIM Tool Kit Command (Send USSD)		1

Software builds for the Asian and European models will initially be separate. However, the aim is to combine the core feature set builds, with Asian specific features being added afterwards. When this integration is achieved the only differences between the two feature sets will be as follows:

	European Models	Asian Models
Languages	Full European Language set	Full European Language set PLUS Simplified Chinese Complex Chinese Thai Vietnamese with tonal marks Bahasa - Indonesian
Additional Features	- none -	All Asian SMS Chinese Date Format Chinese PLMN and In country PLMN Roaming Support for two bitmaps: 15x15 and 15x16 SIM Tool Kit Unicode

4.1 Flexing

See software requirement document version 1.3 (available on Lotus Notes at the following location - EMEA Product Description, Alex Dual Slot StarTAC, Section 8. Appendix.

5 MODELS/VERSIONS

5.1 New Core Sales Models

Model Number	Brand	Description

SE0419AB1**	Motorola	Core Motorola Dual Slot StarTAC Phase 1
	Motorola	Core Motorola Dual Slot StarTAC Phase 2

Note: xx = language; cc = colour

5.2 Other New Sales Models

The models listed below are described in separate variant product descriptions.

Model Number	Region Responsible for PD	Short Description	Unique Items vs Core
SE0420AB1B4	UK	Cellnet / Barclays Dual Slot StarTAC	• Co-branded speaker escutcheon (part number: TBD) • Co-branded keypad (part number: TBD) • Co-branded box artwork (part number: TBD)
TBD	Asia	Alex Phase 2 for Nets	
TBD	France	Alex Phase 2 for France Telecom	

5.3

New Sales Model Structures

Model	Transceiver	Manual	Accessories	Other
Alex Phase 1	**Kit: SWF3569A** Escutcheons: See Appendix	**Kit:** See below **Manual:** See Table 1 below **Literature Kit:** See Table 2 below	Battery (500 mAh): SNN Mini rae Charger: SPN Plug: See Table 1 below	Holster (Plastic): SYN4653 Generic Art Box: Blue Pulp insert: Flip Escutcheon: See Appendix 2
Alex Phase 2				

5.4 European Model, Charger Plug and Manual Requirements

Manuals will be single color, single language, A6, POD configuration. Table 1. below shows all relevant part numbers. A separate 'Literature Kit" will be structured to take additional leaflets, an Accessories Brochure, Sales Promotions and special Warranty cards. Table 2 shows all relevant part numbers. Where no items are listed in the Literature Kit, the pack does not need to be included; if Accessory leaflets are not available at time of launch, product may still ship.

Table 1a. Chargers and Manuals	Charger Plug	Manual		Priority	Market or Language
Alex Phase 1 Country Part N°		Kit Number	Part Number		
SE0419AB1A1	SYN4655	SJN8655A	6809421A26		Danish
SE0419AB1B1	SYN6718 or SYN4656	SJN8656A	6809421A27		English (UK)
SE0419AB1C1	SYN4655	SJN8657A	6809421A28		Finnish
SE0419AB1D1	SYN4655	SJN8658A	6809421A29		Dutch
SE0419AB1E1	SYN4655	SJN8659A	6809421A30		French
SE0419AB1F1	SYN4655	SJN8660A	6809421A31		German
SE0419AB1G1	SYN4655	SJN8661A	6809421A32		Greek
SE0419AB1H1	SYN4655	SJN8662A	6809421A33		Italian
SE0419AB1J1	SYN4655	SJN8663A	6809421A34		Norwegian
SE0419AB1K1	SYN4655	SJN8664A	6809421A35		Portuguese
SE0419AB1L1	SYN4655	SJN8665A	6809421A36		Spanish
SE0419AB1M1	SYN4655	SJN8666A	6809421A37		Swedish
SE0419AB1N1	SYN4655	SJN8659A & SJN8658A			Belgium Package
SE0419AB1P1	SYN4655	SJN8656A, SJN8659A & SJN8662A			Swiss Package
SE0419AB1Q1	SYN4655	SJN8667A	6809421A38		Turkish

Table 1a. Chargers and Manuals	Charger Plug	Manual		Priority	Market or Language
Alex Phase 1 Country Part N°		Kit Number	Part Number		
SE0419AB1R1	SYN4655	SJN8668A	6809421A39		Hungarian
SE0419AB1S1	SYN4655	SJN8669A	6809421A40		Slovakian
Other models	n/a	SJN8670A	6809421A41		Arabic
SE0419AB1T1	SYN4655	SJN8656A, SJN8659A & SJN8670A	English, French & Arabic		North Africa Package
SE0419AB1U1	SYN4655	SJN8671A	6809421A42		Russian
SE0419AB1V1	SYN4655	SJN8672A	6809421A43		Lithuanian
SE0419AB1W1	SYN4655	SJN8673A	6809421A44		Polish
SE0419AB1Y1	SYN4655	SJN8674A	6809421A45		Czech
SE0419AB1Z1	SYN4655	None	None		No language
SE0419AB1B2	SYN4655				English for South Africa
SE0419AB1C2	SYN4655	SJN8675A	6809421A46		Croatian
SE0419AB1F2	SYN4655				German for Austria
SE0419AB1G2	SYN6718 or SYN4656				Cyprus
SE0419AB1P2	SYN4655	SJN8676A	6809421A47		Romanian
SE0419AB1S2	SYN4655	SJN8677A	6809421A48		Slovenian
SE0419AB1T2	SYN6718 or SYN4656	SJN8656A, SJN8659A & SJN8670A	English, French & arabic		Gulf States Package
SE0419AB1U2	SYN4655	SJN8678A	6809421A49		Ukrainian
SE0419AB1X2	SYN4655	SJN8679A	6809421A50		Israeli
SE0419AB1Z2	SYN6718 or SYN4656	None	None		No language
SE0419AB1A3	SYN4655	SJN8680A	6809421A51		Latvian
SE0419AB1C3	SYN4655	SJN8681A	6809421A52		Estonian
SE0419AB1A4	SYN4655	SJN8682A	6809421A53		Bulgarian

Table 1b. Chargers and Manuals	Charger Plug	Manual		Priority	Market or Language
Alex Phase 2 Country Part N°		Kit Number	Part Number		
	SYN4655				Danish
	SYN6718 or				English (UK)

Table 1b. Chargers and Manuals	Charger Plug	Manual		Priority	Market or Language
Alex Phase 2 Country Part N°		Kit Number	Part Number		
	SYN4656				
	SYN4655				Finnish
	SYN4655				Dutch
	SYN4655				French
	SYN4655				German
	SYN4655				Greek
	SYN4655				Italian
	SYN4655				Norwegian
	SYN4655				Portuguese
	SYN4655				Spanish
	SYN4655				Swedish
	SYN4655				Belgium Package
	SYN4655				Swiss Package
	SYN4655				Turkish
	SYN4655				Hungarian
	SYN4655				Slovakian
	n/a				Arabic
	SYN4655				North Africa Package
	SYN4655				Russian
	SYN4655				Lithuanian
	SYN4655				Polish
	SYN4655				Czech
	SYN4655				No language
	SYN4655				English for South Africa
	SYN4655				Croatian
	SYN4655				German for Austria
	SYN6718 or SYN4656				Cyprus
	SYN4655				Romanian
	SYN4655				Slovenian
	SYN6718 or SYN4656				Gulf States Package
	SYN4655				Ukrainian

Table 1b. Chargers and Manuals	Charger Plug	Manual		Priority	Market or Language
Alex Phase 2 Country Part N°		Kit Number	Part Number		
	SYN4655				Israeli
	SYN6718 or SYN4656				No language
	SYN4655				Latvian
	SYN4655				Estonian
	SYN4655				Bulgarian

Table 2: Literature Kits	Kit Number	Market	Kit
Alex Country Part N°			Contents
SE0419AB1A1		Denmark	Accessory Leaflet -
	SJN8591AB2	Generic English	Accessory Leaflet – 68P09415A86
SE0419AB1B1	SJN7832B	UK	Accessory Leaflet – 68P09415A86 Registration Card – 6809408A20
SE0419AB1C1		Finland	Accessory Leaflet -
SE0419AB1D1	SJN7836A	Netherlands	Accessory Leaflet - Registration Card – 6809408A24
SE0419AB1E1	SJN7833A	France	Accessory Leaflet - 68P09415A89 Registration Card – 6809408A21
SE0419AB1F1	SJN7829B	Germany	Accessory Leaflet – 68P09415A90 Registration Card – 6809408A22 24 Hour Service – 68P09405A07
SE0419AB1G1		Greece	Accessory Leaflet -
SE0419AB1H1	SJN7831B	Italy	Accessory Leaflet – 68P09415A92
SE0419AB1J1		Norway	Accessory Leaflet -
SE0419AB1K1	SJN7912A	Portugal	Accessory Leaflet - Warranty Card – 68P09405A09
SE0419AB1L1	SJN7834B	Spain	Accessory Leaflet – 68P09415A95 Registration Card – 6809408A23 Warranty Card – 68P09405A08
SE0419AB1M1		Sweden	Accessory Leaflet -
SE0419AB1N1		Belgium	Accessory Leaflet -
SE0419AB1P1	SJN8274B	Switzerland French German Italian	Accessory Leaflet – 68P09415A89 Accessory Leaflet – 68P09415A90 Accessory Leaflet – 68P09415A92 Warranty Card – 68P09413A83 Warranty Card – 68P09413A81 Warranty Card – 68P09413A82
SE0419AB1Q1		Turkey	Accessory Leaflet -
SE0419AB1R1		Hungary	Accessory Leaflet -
SE0419AB1S1		Slovakia	Accessory Leaflet -
		Arab/Eng./French	Accessory Leaflet -
SE0419AB1T1		North Africa	Accessory Leaflet -
SE0419AB1U1		Russia	Accessory Leaflet -
SE0419AB1V1		Lithuania	Accessory Leaflet –
SE0419AB1W1		Poland	Accessory Leaflet -
SE0419AB1Y1		Czech Republic	Accessory Leaflet -
SE0419AB1Z1	none	Generic- Euro Plug	None
SE0419AB1B2		South Africa	Accessory Leaflet -

Table 2: Literature Kits	Kit Number	Market	Kit
Alex Country Part N°			Contents
SE0419AB1C2		Croatia	Accessory Leaflet -
SE0419AB1F2	SJN7830B	Austria	Accessory Leaflet – 68P09415A90 Registration Card - 24 Hour Service – 68P09414A16
SE0419AB1G2		Cyprus	Accessory Leaflet -
SE0419AB1P2		Romania	Accessory Leaflet -
SE0419AB1S2		Slovenia	Accessory Leaflet -
SE0419AB1T2		Gulf States	Accessory Leaflet -
SE0419AB1U2		Ukraine	Accessory Leaflet - Invalid Battery -
SE0419AB1X2		Israel	Accessory Leaflet -
SE0419AB1Z2	none	Generic- UK Plug	None
SE0419AB1A3		Latvia	Accessory Leaflet -
SE0419AB1C3		Estonia	Accessory Leaflet -
SE0419AB1A4		Bulgaria	Accessory Leaflet -

Note: Italian packages also require the following unique items added to their BOMS:
1 x Loyalty Card (68P09413A84)
2 x Security stickers (5402318T04)

5.5 Service Requirements

The following items are required for service:

	Alex Phase 1	Alex Phase 2
A Service Transceiver with IMEI, with no accessories / manual /etc		
A spare Printed Circuit Board (PCB), fully phased and tested, with an IMEI.		

6 PACKAGING/LABELLING REQUIREMENTS

6.1 Box sizes and packaging materials

Carton Top

In all regions, a half Rae style box size will be used.

All regions will use a new carton cover design consistent with the "Wings" brand / advertising campaign. The artwork has been generated by the advertising agency, McCann-Erickson, and approved for use. Because Distribution centers use different carton formats, two part numbers may be required:

Carton Top part number with Wings design, 2 piece design: TBD

Carton Top part number with Wings design, 1 piece design: TBD

Insert

The insert for the current StarTAC 85 / 70 product will be used for the 2-piece design.

Pulp tray insert part number, 2-piece design: 5609034K01.

All packaging materials should be environmentally friendly. The Pulp insert may be colored Motorola blue.

Artwork: for Stage I, WINGS branded artwork will be defined.

6.2

Labels

Transceiver labels placed in the factory will include ' MOTOROLA' and '**Made in ....**'.

Transceiver labels placed in Distribution will include the following information:

'**Model:** ' plus model number
'**Type:** ' plus Type name
'**MSN:** ' plus MSN in human readable format
'**IMEI:** ' plus IMEI in human readable format (with section spacers and check digit)
IMEI in bar code 128 format
'**CE0168X**' in characters a minimum of 5mm in height

Space must be allowed for the code '**S/L**' for SIM Locked models and for co-branding operator names of up to 10 letters.

European Box labels will include the following:

'**Made in ....** ' in the header
'**Motorola**' plus product name (ie '**StarTAC xxx**')
'**GSM900**' in the header
'**CE**' in the header
Der Grüne Punkt mark in the header
Sequence number in human readable and bar code (format 39)
Model number in human readable and bar code (format 39)
MSN in human readable and bar code (format 39)
IMEI in human readable (with section spacers and check digit) and bar code (format 39)
EAN in human readable and bar code
T-Options in human readable and bar code

Space must be allowed for the OBO text.

NOTE: The presentation of IMEI will be the new Phase II format, which matches the IMEI is the display (ie with 15th check digit) in all human readable forms.

6.3 EANs

Black models will be defined for all countries; other colors will be defined as required.

Mkt/Colour	Alex	EAN	Mkt/Colour	Alex	EAN
Denmark: - Black –TBD –TBD	SE0419AB1A1		Poland: - Black - TBD - TBD	SE0419AB1W1	
UK: - Black - TBD - TBD	SE0419AB1B1		Czech Rep. : - Black - TBD - TBD	SE0419AB1Y1	
Finland: - Black - TBD - TBD	SE0419AB1C1		No Ln (Euro): - Black - TBD - TBD	SE0419AB1Z1	
Netherlands: - Black	SE0419AB1D1		South Africa: - Black	SE0419AB1B2	

Mkt/Colour	Alex	EAN	Mkt/Colour	Alex	EAN
- TBD - TBD			- TBD - TBD		
France: - Black - TBD - TBD	SE0419AB1E1		Croatia: - Black - TBD - TBD	SE0419AB1C2	
Germany: - - Black - TBD - TBD	SE0419AB1F1		Austria: - Black - TBD - TBD	SE0419AB1F2	
Greece: - Black - TBD - TBD	SE0419AB1G1		Cyprus: - Black - TBD - TBD	SE0419AB1G2	
Italy: - Black - TBD - TBD	SE0419AB1H1		Romania: - Black - TBD - TBD	SE0419AB1P2	
Norway: - Black - TBD - TBD	SE0419AB1J1		Slovenia: - Black - TBD - TBD	SE0419AB1S2	
Portugal: - Black - TBD - TBD	SE0419AB1K1		ME (Gulf) - Black - TBD - TBD	SE0419AB1T2	
Spain: - Black - TBD - TBD	SE0419AB1L1		Ukraine: - Black - TBD - TBD	SE0419AB1U2	
Sweden: - Black - TBD - TBD	SE0419AB1M1		Israel: - Black - TBD - TBD	SE0419AB1X2	
Belgium: - Black - TBD - TBD	SE0419AB1N1		No Ln (UK): - Black - TBD - TBD	SE0419AB1Z2	
Switzerland: - Black - TBD - TBD	SE0419AB1P1		Latvia: - Black - TBD - TBD	SE0419AB1A3	
Turkey: - Black - TBD - TBD	SE0419AB1Q1		Estonia: - Black - TBD - TBD	SE0419AB1C3	
Hungary: - Black - TBD - TBD	SE0419AB1R1		Bulgaria: - Black - TBD - TBD	SE0419AB1A4	
Slovak Rep. : - Black - TBD - TBD	SE0419AB1S1		Russia: - Black - TBD - TBD	SE0419AB1U1	

Mkt/Colour	Alex	EAN	Mkt/Colour	Alex	EAN
ME (NAfrica) - Black - TBD - TBD	SE0419AB1T2		Lithuania: - Black - TBD - TBD	SE0419AB1V1	

7

PRODUCT NAME/MARKET NAME

TBD

8 SAMPLE SCHEDULE

This list will be constantly updated as new requirements are submitted.

9 TYPE APPROVAL

Full Phase II Type Approval will be necessary. Type approval should simultaneously be sought in Asia. Type approval should then be supported and obtained in the following countries outside the European Community:

- Russia
- Hungary
- Poland
- Ukraine
- Israel

The phone, the Rapid Travel Charger and Data accessories must also have CE approval.

All models must be Year 2000 compliant.

10 ACCESSORIES & COMPATIBILITY

All accessories are already available, unless otherwise stated.

10.1 Current

Part Number	POS Number	Name
SYN4241	CLA9000	Cigarette Lighter Adapter
SPN4325	CHA9100	Desktop charger
SPN4278	CHA9000 (Eur) CHA9010 (UK)	Universal Rapid Travel Charger
SYN6718	n/a	UK Plug
SYN4655	n/a	Euro Plug
SYN4694	n/a	Aus/NZ Plug
SYN4696	n/a	Indian Plug
SYN4657	n/a	US Plug
SKN4821	n/a	PC Card to Phone Connector Cable
S6112	PCC9100	CELLect™ 1+ German/English
S6113	n/a	CELLect™ 1+ French
S6114	n/a	CELLect™ 1+ Italian / Spanish
CD1181	n/a	CELLect™ 3 Denmark
CD1177	n/a	CELLect™ 3 Germany
CD1183	n/a	CELLect™ 3 Finland
CD1179	n/a	CELLect™ 3 France
CD1175	n/a	CELLect™ 3 Italy

Part Number	POS Number	Name
CD1182	n/a	CELLect™ 3 Norway
CD1178	n/a	CELLect™ 3 Sweden
CD1180	n/a	CELLect™ 3 Switzerland
CD1176	PCC9300	CELLect™ 3 UK
SNN4937	BLM9050	Slim 500 mAh LiIon main battery
SNN4936	BLM9050	XCap 900 mAh main LiIon battery
SNN4938	BNM9050	Standard 500 mAh main NiMH battery
SNN4867	BLA9090	Standard 900 mAh LiIon auxiliary battery
SNN4938	BNA9100	XCap 1000 mAh NiMH auxiliary battery
CD1259	HFK9300	Deluxe DSP car kit with external handset
CD1261	HFK9200	Standard DSP car kit
S7059		External Handset for DSP car kit
SYN5378		Standard belt clip (for auxiliary battery)
SYN4653	CCA9100	Slim belt clip (for main batteries only)
SYN6456	CCA9000	Leather Pouch
SLN3940	**HSK6000**	**Headset Adapter and Headset/Microphone for Alex Phase 2**
	PCC6000	**SmartCellect soft modem**

11 APPENDIX 1: DESIGN & FLEX

A1 Diagram of Alex

A2 Initial Colored Housing Requirements

Alex	**Black**	**TBD**	**TBD**
Lens Part Number	Same as StarTAC 85		
Lens Surround	Black		
Lens Printing	Gold Pantone xxx		
Front Escutcheon Part Number	Same as StarTAC 85		
Front Escutcheon Background	Black		
Front Escutcheon Printing Finish	Relief		
Front Escutcheon Printing	Gold Pantone xxx		
Earpiece Escutcheon Part Number			
Back Escutcheon Background	Black		
Earpiece Escutcheon Printing	Gold Pantone xxx		
Keypad Part Number	38-09105S		
Keypad Background	Black		
Keypad Printing	Orche Gold Pantone 465C White Red Pantone 192C Green Pantone 354C		

A3 Flexing Defaults

Below is a list of the most important default flexing settings:

Feature	Flex Default
Operating Bands	GSM 900
Network Selection	Automatic
Network Search Frequency	Medium
SIM Lock	None
Home Zone	None
VMWI Type	GSM Phase II+ implementation (if supported)
Emergency Number	112
Data	9600 baud
Extended Menus	Off
Ringer	Standard Tone
Ringer Volume	Maximum
Earpiece Volume	Maximum
Keypad Tone	Normal Tones
Greeting Tone	On
Language	Automatic
Keypad Lock	Flip locks keypad when closed
Key Answer Only	Off
Phone Lock	Off
Phone Lock Number	1234
Security Code	000000
Battery Saving Mode	On
In-Call Display	Off
Single Alert Timer Length	30 seconds
Repetitive Timer Length	60 seconds
Phone Book Access	No Restrictions
CLI Alpha Tag Lookup	On
One-Touch dialing	to SIM Memory
Quick Access	User definable
Voicemail Number	from Phone Memory
LED Status Indicator	On
Power key delays	Delay on Power On and Power Off (if supported)

Wake Up Graphics:

A4 Menu Requirements

QA	MENU						
Quick Access	Phonebook	Call Related Features	Messages	Phone Setup	Network Selection	Call Meters	Accessory Setup
Assigned Functions: 1- Find Name 2- Add to SIM 3- Outgoing Messages 4- Battery Meter 5- Phone Lock Now 6- Mute On/Off 7- Read Messages 8- Vibrate On/Off 9- Divert On/Off **Available Functions:** • Find by Name • Find by Location • Add Entry to Phone • Add Entry to SIM • Battery Meter • Phone Lock Now • Phone Mute On/Off • Ring Volume • Vibracall On/Off • Ringer On/Off • Divert All Voice Calls • Switch Memory • Read Messages • Outgoing Messages • Message Editor • Last Calls Received • Last Call Charge • Last Call Timer • Talk and Fax • Show My ID Next Call • Restrict my ID • Key Answer Only • SIM selection	• Personal Numbers • Find Entry By Name • < Personal Numbers > • Call Number • Modify Name or No • Erase Name and No • Find Entry By Location • < Personal Numbers > • Call Number • Modify Name or No • Erase Name and No • Add Entry • Add To Phone Memory • Add To SIM Card Mem • Check Capacity • Check Phone Capacity • Check SIM Capacity • Prevent Access • To SIM Card Memory • To Phone Memory • To Phone & SIM Mem • No Memory Restriction Copy SIM Memory • Show Services • Last Ten Calls • Last Calls Made • Last Calls Received • Erase All Numbers • My Phone Number(s) • < MSISDN List > • Fixed Dialing[2] • View Fixed Dial List • < Fixed Dial List > • Setup Fixed Dialling • < Enter PIN2 > • On • Off • Edit Entry • < Fixed Dial List > • Add Entry • Erase Entry • One Touch Dial Setting • To Phone Memory • To SIM Card • To Fixed Dial List[2]	• Show Battery Meter • Restrict My Phone Number • Show ID On Next Call • Restrict ID On Next Call • Call Diverting • Divert Voice Calls • Divert When Unavail. • Submenu-1 • Divert All Voice Calls • Submenu-1 • *Detailed Diverting* • *If Busy* • *Submenu-1* • *If Not Reachable* • *Submenu-1* • *If No Answer* • *Submenu-1* • Divert Fax Calls • Submenu-1 • Divert Data Calls • Submenu-1 • Cancel All Diverting • SIM selection • **Select Active SIM** • **SIM 1** • **SIM2** • **Select Default SIM** • **SIM 1** • **SIM 2** •Talk and Fax • On/Off • Call Waiting • On/Off • *Call Barring* • *Bar Outgoing Calls* • *Int'l Calls* • *Int'l Calls Ex Home* • *All Calls* • *Off* • *Bar Incoming Calls* • *When Roaming* • *All Calls* • *Off* • *Cancel All Barring* • *Change Bar Password* • Key Answer Only • On • Off	• Call Voicemail • Received Messages • < Message List > • Delete Message • Return Call • Edit Message • < Message Editor> • Send Message • Store Message • Go To Next Message • Outgoing Messages • < Message List > • Send Message • Edit Message • < Message Editor> • Send Message • Store Message • Delete Message • Go To Next Message • Message Editor • Send Message • Store Message • Cell Broadcast • On/Off • Message Settings • Voicemail Number • Service Centre • Expiry Period • Outgoing Message Type • Text • Fax • X400 • Paging • E-mail • ERMES • Voice	Select Phone Line Line 1 Line 2 • Adjust Ring Volume • < Volume Keys > • Ring or Vibrate • Ring Only • Vibrate Only • Vibrate Then Ring • No Ring Or Vibrate Ringer On or Off On/Off • Set Ringer Tone • Standard Tone ... etc • Phone Lock • Automatic Lock • On/Off • Lock Now • Change Unlock Code • Require SIM Card PIN • On/Off • Change SIM PIN Code • Change SIM PIN2 Code[2] • New Security Code • Extended Menus • On/Off • *Show Time and Date* • *Set Time and Date* • *Set Time Format* • *Language Selection* • *Dansk* ... ... • *Türkce* • *Automatic Change Greeting* • *Battery Saving Mode* • *On/Off* • *Select Keypad Tones* • *Normal Tones* • *Single Tones* • *No Tones* • *Phone Status* • *Status Review* • *Master Reset* • *Master Clear*	• Available Networks • < PLMN List > • Register Now • Make Preferred • *Network Search* • *Registration Preferences* • *Automatic Search* • *Manual Search* • *Frequency of Search* • *Slow Search* • *Medium Search* • *Fast Search* • *Continuous Search* • Preferred Networks • Add Network To List • Choose From Available • Choose From Known • Add New Network code • Show List Of Networks • < PLMN List > • Move To New Locn. • Delete Selection • Find New Network	• Show Call Charges[2] • Show Last Call • Total For All Calls • Credit Remaining • Show Call Timers • Show Last Call • Total For All Calls • Reset All Timers • Set Audible Call Timers • Single Alert Timer • On/Off • Repetitive Timer • On/Off • Set In-Call Display • Show Time Per Call • Show Charge Per Call[2] • Show Total Call Charges[2] • No In-Call Display • Call Charge Settings[2] • < Enter PIN2 > • Reset Call Charges • Set Total Charge Limit • On/Off • Set Charge Type • Units • Currency • *Lifetime Timer*	• Mute Car Radio • On/Off • Automatic Answer • On/Off • Automatic Handsfree • On/Off • Safety Timer • On/Off • Auxiliary Alert • On/Off **Submenu-1** • On Voicemail • Other Number • Off

Product Description

Alex - Dual slot StarTAC

Created By: Guy Lanrezac-WPGL01 on 29/04/98 at 19:33
Category: Composition

Version Number: 4

Hot Spot to PR Number Assignment database. This Hot Spot for use by ECSG personnel only.
Click in Hot Spot, to view, or to generate a request for a Product Release (PR) number.

PR Number: A28-32

Motorola Confidential Proprietary

Insert Table in field below to define key changes. Go to Menu -> Create -> Table. Make table 4 columns wide.
Enter brief summary of any updates below:

Change Control:

Version Number	Date	Editor	Key Changes
Draft 0.1	April 29th	Guy Lanrezac	
Draft 0.2	May 13th	Guy Lanrezac	
Draft 0.3	May 20th	Guy Lanrezac	
Draft 0.4	June 1st	Guy Lanrezac	

Insert Table in field below to define release approvals. Go to Menu -> Create -> Table. Make table 3 columns wide.
When ready for release, submit for signatures. Define who signed below.
Each subsequent version change requires release signatures.

Release Approval Summary:

Version Number	Signed by	Date

Market Name:
Dual Slot GSM 900 StarTAC 85

Ship Authorization date:
(use format DDMMMYY)

Give a general introduction for this product requirement.
This document describes the new generation of dual slot phones. Dual Slot StarTAC will be available in GSM Phase 2 in the GSM 900 band. This same product could be made available in the GSM 1800 band or GSM 1900 band. The market requirements goal for ship acceptance of the GSM 900 Alex is Q41998

Signaling Type: GSM

Define Key Selling Points and Message:
Dual Slot StarTAC will be differentiated from the key competitors by the follwoing advantages:

Best in class form factor (weight and volume)
Best smart card storage handling

Dual Slot StarTAC wil lbe differentiated from the key competitors by the following advanced operator features:

Third party Smart Card capable (over & above SIM)
SIM Tool Kit Class 2
Dedicated Key to SIM Tool Kit menu
Dual Slot Sim Tool Kit commands (standardised in SMG9)

Dual Slot StarTAC will be differentiated from the key competitors by the following advanced features:

Ergonomic styling
Large graphic display
Vibracall
Easy access to Smart Card applications

Product Strategy
Market research has identified that end users are looking for easier ways to do financial transactions by "getting rid of the coins" and "reducing the number of cards". .
Dual Slot StarTAC will be marketed as the first Smart Card handset allowing financial transactions. As an example, the Smart Card terminal will allow an "electronic purse" card to be reloaded over the air. This will offer a new relation between the phone and the consumer. Future stages will allow the end user to do direct financial transactions, ticketing and loyalty schemes over the air. In addition, the dual slot StarTAC will offer secure access to remote services, authentication. The Dual Slot StarTAC is to gain the business and consumer markets where state of the art technology influences decision purchase.
This is a unique product, the first of a new category of product that Motorola intends to dominate. This category is all about allowing Smart Cards to work in MOBILE environments (eg Smart Card ticked - Mobile Ticketing).
The category facilitates new supporters, partners, channels to market.

Define Product Tier (High, Mid, or Low):
High
Thought is being given to a low tier product for pre-pay applications.

Define Distribution Channel:
At first dual slot StarTAC will be packaged with an operator SIM card meaning that the distribution of the dual slot StarTAC will be tightly linked to both GSM subscription & smart card services issuers. This will drive the following issues: dual phone / package-branding, promotion, distribution, and customer care. Direct mailing mailing through the Value Addes Service Providers (Smart Card issuer) will be heavily used.

Define Competitors:
There are no competitors to date shipping a smart card handset. The only trial which gets closest is the Alacatel One Touch Pro with Barclays, Gem Plus and Cellnet.
Competitive inteligence have informed us that Siemens and Alcatel are preparing a dual slot handset. Nokia are known to defend a different category of handsets (with a small SIM) using RF & infra-red capabilities.

Define Key Target Customers:
Consumer Target:
Alex will be defined at mid to high tier consumers seeking premium products with state of the art technology. These consumers will typically be international credit card users (Amex, Premier or Gold). The purchase decision will be motivated by the incredible form factor and the world's first Smartcard compatible handset. They will by definition already value the benefits of smart cards and the benefits of mobile telephony.
Client Target:
Alex will be focused on key and influential targets that will help Motorola to:
1/ create and support this new product category,
2/ champion standard internationaly,
3/ establish security guidelines (processes),
4/ champion Motorola's certification and type approval through VISA, Mastercard & Banksys etc... institutions.

Define product tiering strategy, and any planned variants, for this product:
This handset will be tiered above the existing StarTAC 85. The premium price will be justified by the world's first Smartcard compatible handset. At first, this product will be bundled with airtime, thus giving a subsidized package price.

Define Models to be Replaced by this Product:

Place cursor in field below. Go to Menu, select Create -> Table, then define number of rows you require, by 3 columns.

Model Name	Model Number	Comments

Define Target Markets:
The first target markets are in the process of being identified. UK, Belgium, Portugal and Hong Kong are for the moment the most active countries liable of supporting Smartcard infrastructure.

Define Advertising Requirements, Specifications to Advertise, and Key Message to be delivered:
Alex is the next step of Motorola's leading technology in mobile handsets. While conserving the market's most wearable phone form factor, Motorola offers the world first Smartcard handset that combines traditional GSM digital cellular phone features with electronic cash services - paving the way for mobile ATM, remote ticketing, pay-as-you-use telephony and on-line payment transactions using smart cards.

It is this smart card capability that transforms it into a new generation of cellular phone. One capable of converging remote connectivity with electronic cash and service transactions. No more queuing for currency, travel tickets or payment - in the future, simply insert the relevant smart card into the Motorola Smartcard phone, then dial-up, book and pay for goods and services, access bank account details and even download money onto your smart cash card.

Alex is the first secure device that allows everyone from telecoms operators and smart card manufacturers to banks and financial institutions, to unlock the potential of the smart card. It creates a platform for the future development of mobile e-purse, remote electronic commerce and numerous other wireless services.

As well as generating new profitable value added services for the industry, the phones will also create new levels of convenience for users - a new cashless society where they can instantly access electronic cash and services at any time, wherever they are.

Define Phone Physical Characteristics. Insert drawings, photos, or other representation if available.
Alex housing will be based on the existing StarTAC 85. The opening flip will need to be modified. The top part of the flip wiill be thicker to accomodate the small card reader. This will enable the use of standard StarTAC batteries. Line drawings will be made available at a later stage.

Define Housing Physical Characteristics. Insert drawings, photos, or other representation if available.
The back housing will be identical as the StarTAC 85 with the exception of the circled M which will be in gold as per the StarTAC 130 (Kramer).

Define Battery Door Physical Characteristics. Insert drawings, photos, or other representation if available.
Not relevant

Define Display Physical Characteristics. Insert drawings, photos, or other representation if available.
The Alex display will be identical to the StarTAC 85. The display will be a 96 x 32 pixel grid display with two rows of icons (top and bottom). Icons will include signal strength, battery charge indicator, in service, roaming, and SMS notification.

Define Lens Physical Characteristics. Insert drawings, photos, or other representation if available.
The Alex lens will be identical to the StarTAC 85 display.The lens will have a black border with gold Motorola printing centered at the top of the lens.

Define Keypad and Keypad Board Physical Characteristics. Insert drawings, photos, or other representation if available.
The Alex keypad will be specific. The MR key will be replaced by a circled M key. The colour of the marking is to be defined (between white or gold).

Define Escutcheon Physical Characteristics. Insert drawings, photos, or other representation if available.
The interior escutcheon below the speaker will differentiate Alex from other StarTAC platforms. The name or number is under elaboration: StarTAC Smart, like what was done for StarTAC voice. If this was the chosen name, then the circled M key could be replaced by a key with "Smart" written on it. A number could also be a possibility to remind the dual slot capability (StarTAC 200).

Define Antenna Physical Characteristics. Insert drawings, photos, or other representation if available.
The antenna for Alex is identical to the StarTAC 85

Define Connectivity Physical Characteristics. Insert drawings, photos, or other representation if available.
Alex will support connectivity to peripheral devices through a Rae syle connector. Through this connector, Alex will support rapid charging, CLA device, data cable, and headset adapter.

Define SIM Card, and SIM Card Reader Physical Characteristics. Insert drawings, photos, or other representation if available.
Alex will be the worlds first mobile phone to simultaneously accept two SIM cards. One small SIM format below the battery and one large SIM (ISO) like the StarTAC 85.

Define any other physical characteristics.
Status LED Indicator: A status LED will be utilized on the back, upper right side of the phone. Conventional color coding will be used: green will mean in service, red will mean no service, and orange will mean in service roaming.

Side buttons: Three side buttons will be utilized, similar to the existing StarTAC 85 and 70. The top and bottom buttons will control volume control and phone book scrolling, while the middle "smart" button will access the phonebook and place the call if held.

Define Transceiver Performance:

Place cursor in [ ] below header. Go to menu, select Create -> Table. Select number of rows you require, by 5 columns wide.

Volume (cubic cm)	**Weight (grams)**	**Talk Time (minutes)**	**Standby Time (hours)**	**With Battery (Name)**
TBD	TBD	TBD	TBD	Slim 350 mah Li Ion
TBD	TBD	TBD	TBD	Slim 500 mah Li Ion
TBD	TBD	TBD	TBD	Standard 900 mah Li Ion
TBD	TBD	TBD	TBD	AAA 500 mah NiMH
TBD	TBD	TBD	TBD	Standard 900 mah Li Ion plus 900 mah Aux Batt

All times are approximate and will vary depending on netwrok and status, and the functions selected. Standby times are quoted as a range from DRx = 2 to DRx = 9. Talktimes are quoted as a range from DTx off to DTx on. Support of DTx mode is dependent on netwrok support and may not be available in all areas.

Define Battery Technology compatibility and Security requirements:
Alex will be compatible with all existing RAE style batteries, including Li Ion and NiMH technologies

Define Charge Times with the sharger shipped as standard:

Place cursor in [ ] below header. Go to menu, select Create -> Table. Select number of rows you require, by 3 columns wide.

Battery	**Charge time with E. P. Standard Travel Charger to 90 % charge (Minutes)**	**Charge time with E. P. Desktop Charger to 90 % charge (Minutes)**
NiMH batteries	70 mn	
LiIon batteries	150 mn	

The unit must support feature seamless power transitions with travel charger and cigarette lighter adapter.

Define Data Compatibility:
Alex will be able to send and recieve data at 9600 bps with a CELLect card like the StarTAC 85. Note that Alex will not work with the SmartCell + Soft modem.

Define any requirements in general terms, or define overall requirements scope:

Key Software Requirements:

Define Key Software Requirements. Insert drawings, photos, or other representation if required, after table.

Place cursor in [ ] below header. Go to menu, select Create -> Table. Select number of rows you require, by 5 columns wide.

Tracking Number	Description	Status - First Launch	Status - Main Launch	Priority
*from Software Requirement document version 1.2				
All Software Requirements are specified in the Official Software Requirement version 1.2				
2.1*	Multiple card management	Commited		1
2.2*	Change Requests following Sydney SMG9 meeting	Commited		1
2.3*	Support of Asia Language	In definition, not commited		1
6.1.1*	SAT menu selection via dedicated key	In definition, not commited		1

Key Hardware Requirements:

Define Key Hardware Requirements. Insert drawings, photos, or other representation if required, after table.

Place cursor in [ ] below header. Go to menu, select Create -> Table. Select number of rows you require, by 5 columns wide.

Tracking Number	Description	Status - First Launch	Status - Main Launch	Priority

Please see attached document

Define Flex Requirements. This is the list of most important default flexing settings.
Insert drawings, photos, or other representation if required, after table.

Place cursor in [ ] below header. Go to menu, select Create -> Table. Select number of rows you require, by 2 columns wide.

Feature	Flex Default
Operating Bands	GSM 900
Network Selection	Automatic
Network Search Frequency	Medium
SIM Lock	None
Home Zone	None
CPHS Feature Package	Off
VMWI Type	GSM Phase II+ implementation (April launch)
Emergeny Number	112
Data	9600 baud
Extended Menus	On
Ringer	Standard Tone
Ringer Volume	Maximum
Earpiece Volume	Maximum
Keypad Tone	Normal Tones
Greeting Tone	On
Language	Automatic

Keypad Lock	Clam locks keypad when closed
Key Answer Only	Off
Phone Lock	Off
Phone Lock Number	1234
Security Code	000000
Battery Saving Mode	On
In-Call Display	Off
Single Alert Timer Length	30 seconds
Repetitive Timer Length	60 seconds
Phone Book Access	No Restrictions
CLI Alpha Tag Lookup	On
Turbo-dialling	to SIM Memory
Quick Access	User definable
Voicemail Number	from Phone Memory
LED Status Indicator	On
Power key delays	Delay on Power On and Power Off

Insert Wake Up Graphic required:

Define Menu Requirements.
Insert graphic detail for new quick access icons, after table.

Place cursor in [ ] below header. Go to menu, select Create -> Table. Select number of rows you require, by 3 columns wide.

Quick Access

Assigned Functions:
1- Find Name
2- Add to SIM
3- Call Voice mail
4- Battery Meter
5- Phone Lock Now
6- Phone Mute On/Off
7- Read Messages
8- Vibrate On/Off
9- Divert On/Off

Available Functions:

Find by Name
Find by Location
Add Entry to Phone
Add Entry to SIM
Call Voice mail
Battery Meter
Phone Lock Now
Phone Mute On/Off
Ring Volume
Vibracall On/Off
Divert All Voice Calls
Switch Memory
Read Messages
Outgoing Messages
Message Editor
Last Calls Received
Last Call Charge
Last Call Timer
Talk and Fax
Show My ID Next Call
Restrict my ID
Key Answer Only

Place cursor in [ ] below header. Go to menu, select Create -> Table. Select number of rows you require, by 7 columns wide.

Phone Book	**Call Related Features**	**Messages**
Personal Numbers	Show Battery Meter	Call Voice mail
Find Entry By Name	Restrict My Phone Number	Received Messages
<Personal Numbers>	Show ID On Next Call	<Message List>
Call Number	Restrict ID On Next Call	Go to Next Message
Modify Name or No	Call Diverting	Delete Message
Erase Name and No	Divert When Unavail.	Return Call
Find Entry By Location	Submenu-1	Edit Message
<Personal Numbers>	Divert All Calls	Outgoing Messages
Call Number	Submenu-1	<Message List>
Modify Name or No	*Detailed Diverting*	Send Message
Erase Name and No	*Divert Voice Calls*	Edit Message
Add Entry	*Divert All Voice Calls*	Message Editor
Add To Phone Memory	*If Busy*	<Message Editor>
Add To SIM Card Mem	*If No Answer*	Send Message
Check Capacity	*If Not Reachable*	Store Message
Check Phone Capacity	*Divert Fax Calls*	Go To Next Message
Check SIM Capacity	*Divert Data Calls*	Cell Broadcast
Prevent Access	Cancel All Diverting	On/Off
To Phone Memory	Talk and Fax	Message Settings
To SIM Card Memory	On/Off	Voice mail Number
To Phone & SIM Mem	Call Waiting	Service Centre
No Memory Restriction	On/Off	Expiry Period

Show Services
Last Ten Calls
- Last Calls Made
- Last Calls Received
- Erase All Numbers

My Phone Number(s)
- <MSISDN List>

Fixed Dialling[2]
- View Fixed Dial List
  - <Fixed Dial List>
- Setup Fixed Dialing
  - <Enter PIN2>
  - On
  - Off
  - Edit Entry
  - <Fixed Dial List>
  - Add Entry
  - Erase Entry

One Touch Dial Setting
- To Phone Memory
- To SIM Memory
- To Fixed Dial List[2]

Call Barring
- *Bar Outgoing Calls*
  - *Int'l Calls*
  - *Int'l Calls Ex Home*
  - *All Calls*
  - *Off*
- *Bar Incoming Calls*
  - *When Roaming*
  - *All Call*
  - *Off*
- *Change Bar Password*

Key Answer Only ***
- On
- Off

Outgoing Message Type
- Text
- Fax
- X400
- Paging
- E-mail
- ERMES
- Voice

Place cursor in [ ] below header. Go to menu, select Create -> Table. Select number of rows you require, by 7 columns wide.

Phone Setup **Network Selection** **Call Meters** **Accessory Setup**

Adjust Ring Volume
<Adjust Ring Vol>
Ring or Vibrate
Ring Only
Vibrate Only
Vibrate then ring
No ring or vibrate
Set ringer tone
Standard tone...etc
Set ringer Tone 2
Stand Tone ...etc
Phone Lock
Automatic Lock
Lock Now
Require SIM card PIN
On
Off

Change SIM PIN code
Change SIM PIN2 code[2]
New security code
Extended Menu
On/Off
Show time and date
Set time and date
Set Time Format
Language selection
Dansk
Tyrkce...
Battery saving mode
On/Off
Select keypad tones
Normal tones
Single tones
No tones
Phone status
Status Review
Master Reset
Master Clear

Available Networks
<PLMN List>
Register Now
Make Preferred
Network Search
Registration Preferences
Automatic Search
Manual Search
Frequency of Search
Medium Search
Fast Search
Continuous Search
Preferred Networks
Add Network To List
Choose From Available
Choose From Known
Add New Network
Commande
Show List Of Networks
Find New Network

Show call charges[2]
Show last call
Total for all calls
Credit remaining
Show Call Timers
Show last call
Total for all calls
Reset All Timers
Set Audible Call Timers
Single Alert Timer
On/Off
Repetitive timer
On/Off
Set In-Call Display
No In-Call Display
Show Time Per Call
Call Charge Settings

<Enter PIN2>
Reset Call Charges
Set Total Charge Limit
On / Off
Set Charge Type
Units
Currency
Lifetime Timer

Mute car radio
On/Off
Automatic answer
On/Off
Automatic hands free
On/Off
Safety Timer
On/Off
Auxiliary Alert
On/Off

Define Box , Box Insert, and Overpack requirements. Identify if these are common existing designs, or new designs.
Insert or attach drawing, or photos, if available.

Standard Box pack configuration.
Define standard model complement. Identify all components which go into this pack configuration.

Place cursor in [ ] below header. Go to menu, select Create -> Table. Select number of rows you require, by 4 columns wide.

Configuration	Contents	Quantity	Comments

Extended Box pack configuration.
Define extended model complement, (more items than standard model complement).
Identify all components which will go into this pack configuration.

Place cursor in [ ] below header. Go to menu, select Create -> Table. Select number of rows you require, by 4 columns wide.

Configuration	Contents	Quantity	Comments

Define Packaging, Manual and Label Artwork requirements. Identify which items require a unique artwork.
Insert or attach drawing, or photos, if available.

Define any unique package Labeling required for this product. Include special requirements such as TIM Metricola numbers, etc.
Include all labels, including transceiver, packaging, accessories, etc.

Insert or attach drawing, or photos, if available.

EAN Numbers for each product type, for each market:
Define EAN Numbers:

Place cursor in [ ] below header. Go to menu, select Create -> Table. Select number of rows you require, by 4 columns wide.

Market (Country)	Product Name	EAN Number	Comments

Define Current Accessories and Compatibility to this product:

Place cursor in [ ] below header. Go to menu, select Create -> Table. Select number of rows you require, by 3 columns wide.

Model, Kit, or Part Number	Accessory Name	Compatibility Notes

Define Planned Accessories and Compatibility to this product:

Place cursor in [ ] below header. Go to menu, select Create -> Table. Select number of rows you require, by 4 columns wide.

Model, Kit, or Part Number	Accessory Name	Compatibility Notes	Availability Date

Define Type Approval Requirements, such as GSM Phase 2, and other Approval Requirements, such as CE Compliance, E Mark Compliance, etc. Include compliance specification number definition where required.
Financial type approvals on security need to be assesed from financial institutions such as VISA, Mastercard, NETS (Singapore scheme), Banksys.

Hot Spot to Assembly Number Assignment database. This Hot Spot for use by all personnel.
Click in Hot Spot, to view, or to generate a request for model, kit, or assembly numbers.

New Sales Models:

Place cursor in [ ] below header. Go to menu, select Create -> Table. Select number of rows you require, by 3 columns wide.

Sales Model Number	Brand	Description

New Field Service Models:

Place cursor in [ ] below header. Go to menu, select Create -> Table. Select number of rows you require, by 3 columns wide.

Field Service Model Number	Brand	Description

Define New Sales Model Content for the First Core Product. Include all model, kit, or item numbers:

Place cursor in [ ] below header. Go to menu, select Create -> Table. Select number of rows you require, by 5 columns wide.

Models	Transceiver	Manual	Accessories	Other

Define any upcoming variants required, beyond this core product introduction.
These programs will be separately defined, with their own product description, etc.:

Hot Spot to Assembly Number Assignment database.
Click in Hot Spot, to view, or to generate a request for model, kit, or assembly numbers.

Define Manual requirements, and any translation priorities for the various models. Attach "01R" documents if applicable.

Place cursor in [ ] below header. Go to menu, select Create -> Table. Select number of rows you require, by 5 columns wide.

Models	Manual Kit Number	Manual Part Number	Language Market	Translation Priority

Define Core Schedule Milestone Requirements:

Schedule Milestone	Units	Requested Date (DDMMMYY)	Comments
Non-Functioning			
Cosmetically Correct Units			
For Marketing Purposes			
Functioning Units			
For Marketing Purposes			
(final functionality not required)			
Field Engineering		October 1st 1998	These tests will be carried out in partnership with the concerned operators
Test Samples			
Worldwide Operator		October 1st 1998	
Test Samples			
Market Trial			
Test Samples			
Launch Requirements		December 1st 1998	

Define any other Key Schedule Milestones:

Required Introduction Date:
Launch Volume (number of units):

Period (MMMYY)	Volume Region 1	Volume Region 2	Volume Region 3	Volume Other	Volume Total Worldwide
Required Stock for Launch .	0	0	0	0	0

Define expected Product Lifetime:

Keep a list of all requirements requested in this product description, from the first draft through final copy, which ARE NOT POSSIBLE in this product design. The intent of this section is to keep a running list of all non-fulfilled requirements, for inclusion in the next product design activity.

Approval of this product description, brings an agreement between all team members, on what will be included in this product design. Items in this section are EXCLUDED from the approval.

Define Key Requirements Excluded From This Product Description, but required for future product introduction.

Insert drawings, photos, or other representation if required, after table.

Place cursor in [ ] below header. Go to menu, select Create -> Table. Select number of rows you require, by 5 columns wide.

Tracking Number	Description	Status - First Launch	Status - Main Launch	Priority
	Phase 2 USSD			
	Copy SIM memory			
	Circuit Switch Data			

Define Other Expected Customers, in First 3 Months of Production:

Customer Name	Product Required	Comments

Attach any additional information required:

Greater China and South Asia Cellular Subscriber Sector

Product Service Preview

DCS STARTAC 90/74/70

Models (90):	S6691ABB	HONG KONG PEOPLE TELEPHONE
	S6692ABB	HONG KONG NEW WORLD
	S6693ABB	HONG KONG MANDARIN COMM
	S6694ABB	HONG KONG HUTCHISON
	S6695ABB	HONG KONG PACIFIC LINK
	S6696ABB	HONG KONG P PLUS
	S6374ABB	SINGAPORE
	S6375ABB	THAILAND (Package 1)
	S7192ABB	THAILAND (Package 2)
	S6373ABB	MALAYSIA
	S7345ABB	MALAYSIA (SIM Locked)
	S7120ABB	INDONESIA
	S7143ABB	TAIWAN
Transceiver (90):	SUG1120A	
Models (74):	S7251AAB	HONG KONG (Package 1)
	S7324AAB	HONG KONG (Package 2)
	S7252AAB	TAIWAN
Transceiver (74):	SUG1148A	
Models (70):	S7256AAB	SINGAPORE
	S7253AAB	THAILAND
	S7254AAB	INDONESIA
	S7255AAB	MALAYSIA
Transceiver (70):	SUG1144A	

Weight and Volume:
Weight with Slim battery : 125 grams
Volume = 119 cc

Description:

1.The housing and the dimension is same as GSM Startac Except the Antenna is a little shorter than the GSM Startac.
2.DCS StarTAC 90 is black in color while both 74 and 70 charcoal grey in color. Both 90 and 74 have a 4-line graphic B/W LCD display while 70 has a display like that of 8400. Only 90 has the Vibrate Alert.
3.Frequency range : RX - 1805.2 - 1879.8 MHz
TX - 1710.2 - 1784.8 MHz
4. PCB and Components layout are very similar to that on GSM Startac.
5. Same size SIM Card as GSM Startac.
6. Talk time of the Slim Battery is 100 (No DTX) , 120 (DTX) minutes.

Test Equipment :

1. HP8922H

2. HP83220E
3. 46103U: WinGate 22, order HP83220E (Option 18) and add to 46103U for phasing DCS and Dual Band radios. Existing software, v1.15.76, can phase DCS StarTAC.

Set Up :

Service Tools:

DCS Startac uses the same antenna tool , Screw Driver and the Extension Board as GSM Startac.

TA Label file: It is available.

Circuit Description :

1. Receive IF is 215 MHz
2. RX LO is 430 MHz
3. TX LO is 240 MHz (GSM Startac is 80 MHz)
4. Channel assignment :
   TX Frequency = (CH - 511)*2 + 1710
   example : Frequency of Ch 579 is (579-511)*2 + 1710 = 1723.6 MHz
   RX Frequency = TX + 95

   example : Ch 579 TX = 1723.6 , RX = TX + 95
   = 1723.6 + 95
   = 1818.6 MHz
5. Oscillator Crystal Y201 same as GSM Startac is 13 MHz

6. External Connector (Butt Plug) does not support Audio In/Out. Audio Signal will be converted for in/out via Uplink and Downlink.

* Note : The other is same as GSM Startac ,

Field Service Plan:

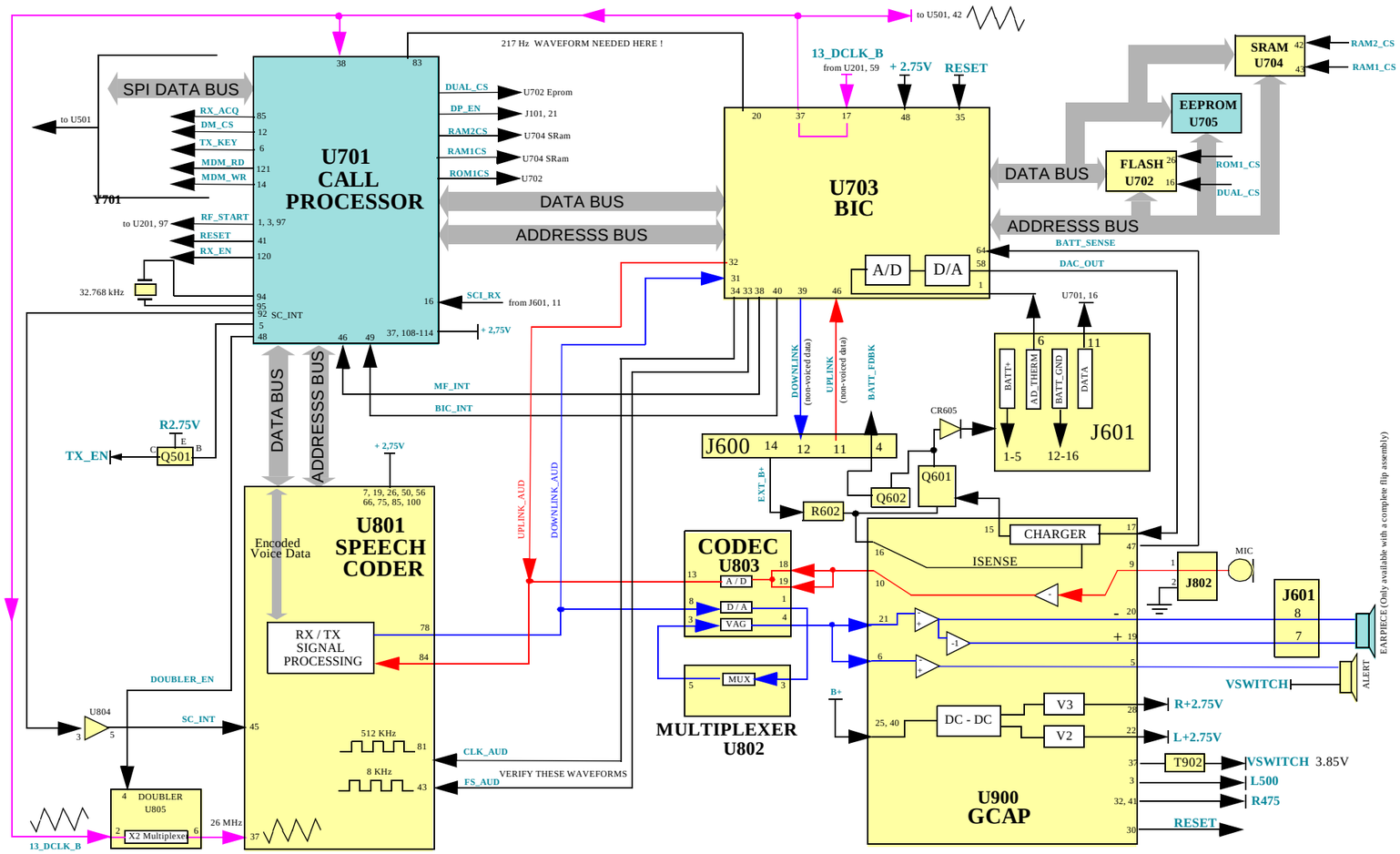
Distributors: Spare boards are available.

Motoroloa HTCs: L1 and L3 parts lists and schematics are available at Error! Bookmark not defined.. Please contact Error! Bookmark not defined. for any inquires.

Repairability:

Same as GSM Startac

DCS StarTAC AUDIO LOGIC BLOCK DIAGRAM



LOGIC BOARD SIGNALS

Measured in standby mode

RX_EN	2.8mVpp 10ms / cm	From the CPU (U701). When high, Rx path enabled and low muted. 1. Enables the Rf switch (U400) for receive mode. 2. Biases the mixer Q420, and low noise amp (Q421).
TX_EN	7Vpp 10ms / cm	From CPU (U701), but inverted by Q501. High when 1. Enable the Rf switch for transmit mode & also the GIFSYN for transmit mode. 2. Supply Voltage for the PAC IC. 3. Isolates RF, by switching the PA Bias Circuitry (Not shown).
RESET	power on 2.8Vrms 200ms / cm	Controlled at power up by GCAP (U900) & CPU (U701). 1. Connected to CPU (U701), BIC (U703), Modem (U501) & Speech coder (U801). After power up sequence, any chip can hold RESET low to power phone off if there is a problem.
DUAL_CS	2.8Vpp 100ns / cm	From CPU (U701) to Eprom. 1. Chip Enable controlling read/write access to and from Eprom (U702).
RAM1_CS	2.8Vpp 100ns / cm	From CPU (U701) to SRAM. 1. Chip Enable controlling read/write access to and from 1st half of SRAM (U704).
RAM2_CS	2.8Vpp 100ns / cm	From CPU (U701) to SRAM. 1. Chip Enable controlling read/write access to and from 2nd half of SRAM (U704).
ROM1_CS	2.8Vpp 100ns / cm	From CPU (U701) to Eprom. 1. Chip Enable controlling read/write access to and from Eprom (U702).
DP_EN	start up or press key 2.8Vpp 100ns / cm	From CPU (U701) to display, via connector J101. 1. Processor selects to enable display. When high, the display is enabled and low disabled.
SC_INT	start up or press key 2.8Vpp 2ms / cm	Speech Coder Interface. This is a signal from uP (U701) to Speech Coder (U801). 1) This is a 20ms timing signal from U701 which times the decoding and encoding function of the Speech Coder U801.
Doubler_EN	power on 2.8vpp 100ms / cm	From CPU (U701) to Clock Doubler U805. 1) This signal enables the Clock Doubler U805 which doubles the 13MHz clock to 26MHz to time the Speech Coder. When high U805 is enabled and low disabled.
MF_INT	2.8Vpp 1ms / cm	From BIC to uP. This signal periodically interrupts the uP at 217Hz. During Power Saving mode this signal is set to DC.
BIC_INT	press a key 2.8Vpp 50us / cm	From BIC to uP. This signal interrupts the uP for a number of reasons. 1. Keypad detection 2. Power Sense 3. SIM Functions 4. DSC Bus Status Indicators
UPLINK	2.8Vpp 10us / cm	From butt plug (J600) to BIC chip (U703).This is a comms link from an external peripherale and the phone, and could be either data information or speech information. It is also used to sense the presence of a DHFA and the ignition status of the DHFA with DC levels
DOWNLINK	5Vpp 10us / cm	From BIC chip (U703) to butt plug (J600).This is a comms link from an external peripherale and the phone, and could be either data information or speech information. It is also used to sense the presence of a DHFA and the ignition status of the DHFA with DC levels
CLK_13_IN	1.6Vpp 50ns / cm	From GIF Syn to BIC IC - 13MHz clock.. This is the master clock reference required for the radio

Measured in test mode

AUDIO IN	test mode 08#, 10#, 36# 434#, 477# 2.7Vpp 5uss / cm	External audio from butt plug, directly to Speech Coder IC
AUDIO OUT	test mode 08#, 10#, 36# 434#, 477# 2.8Vpp 5us / cm	External audio from Speech Coder via GCAP to butt plug
CLK_AUD	2.8Vpp 5us / cm	This signal is from the BIC to the Speech Coder It is a timing signal and runs at 512KHz, and times the transfer of speech information on the DSC Bus between BIC and Speech Coder.
FS_AUD	2.8Vpp 5us / cm	This signal is from the BIC to the Speech Coder IC. It is a timing signal at 8KHz and provides for frame synchronisation during speech transfer on the DSC bus.

AL LAYER - ORDERABLE SPARES

Part Designator	Part Description	Part Number	Part Designator	Part Description	Part Number
A2 / A3	Ground clips Ant. tube	4209480E01	T902	Choke / Vswitch	2509306J01
AL800	Alert	5009473S01	U703	IC BIC	5109743E13
CR605	Diode / Charger	4809653F03	U704	IC SRAM	5109688L09
J101	32 Pin Display Connector	2809454C02	U801	IC Speech Coder	5199285C01
J600	15 Pin Extern Connector	0909449B04	U802	IC Multiplexer	5109632D44
J601	Flip Flexprint Connector	0909059E01	U803	Codec IC	5109920D15
J802	Microphone Connector	0909195E01	U804	IC Buffer	5109522E10
J900	SIM Connector	4009169E01	U805	IC Frquency Doubler	5109781E47
MIC	Microphone	5009536H15	U900	IC GCAP	5109632D69
Q501	Transitor TX_EN	4809607E05	Y701	XTAL 32.768KHZ	4809995L05
Q601	Power Transistor Charger	4809579E17	U702	Flashed Eprom (boot sector)	5102486T01
Q602	Transistor Batt Feedback	4809939C04	S1 - S3	Volume / Mute Switch	4009060E01
R602	Resisor / Charger Sensing	0680195M64	SH25 - 27	Ground Clips	4204774Z01

TEST COMMANDS

# press 2 sec.	Enter Manual Test Mode
01 #	Exit Manual Test Mode
07 #	Mute Rx Audio Path
08 #	Unmute Rx Audio Path
09 #	Mute Tx Audio Path
10 #	Unmute Tx Audio Path
11 #	Program Main Local Osc. to Channelbb
12 #	Set Tx Power level to fixed valure
19 #	Display SW Version Number of Call Processor
20 #	Display SW Version Number of Modem
22 #	Display SW Version Number of Speech Coder
25 #	Set Continuous AGC
26xxxx #	Set Continuous AFC
31x #	Initiate Pseudo-Random Sequence with Midamble
33xxx #	Synchronize to BCH Carrier
36 #	Initiate Acoustic Loopback
37 #	Stop Test
45xxx #	Serving Cell Power Level
46 #	Display Current Valure od AFC DAC
47x #	Set Audio Volume
58 / xxxxxx #	Display / Modify Security Code
59 / xxx #	Display / Modify Lock Code
60 #	Display IMEI

RX SIGNAL PATH
TX SIGNAL PATH
MAIN VCO SIGNAL PATH
TUNING VOLTAGES
REFERENCE CLOCK
Orderable Part
Non - Orderable Part

Europe, Middle East & Africa Customer Services

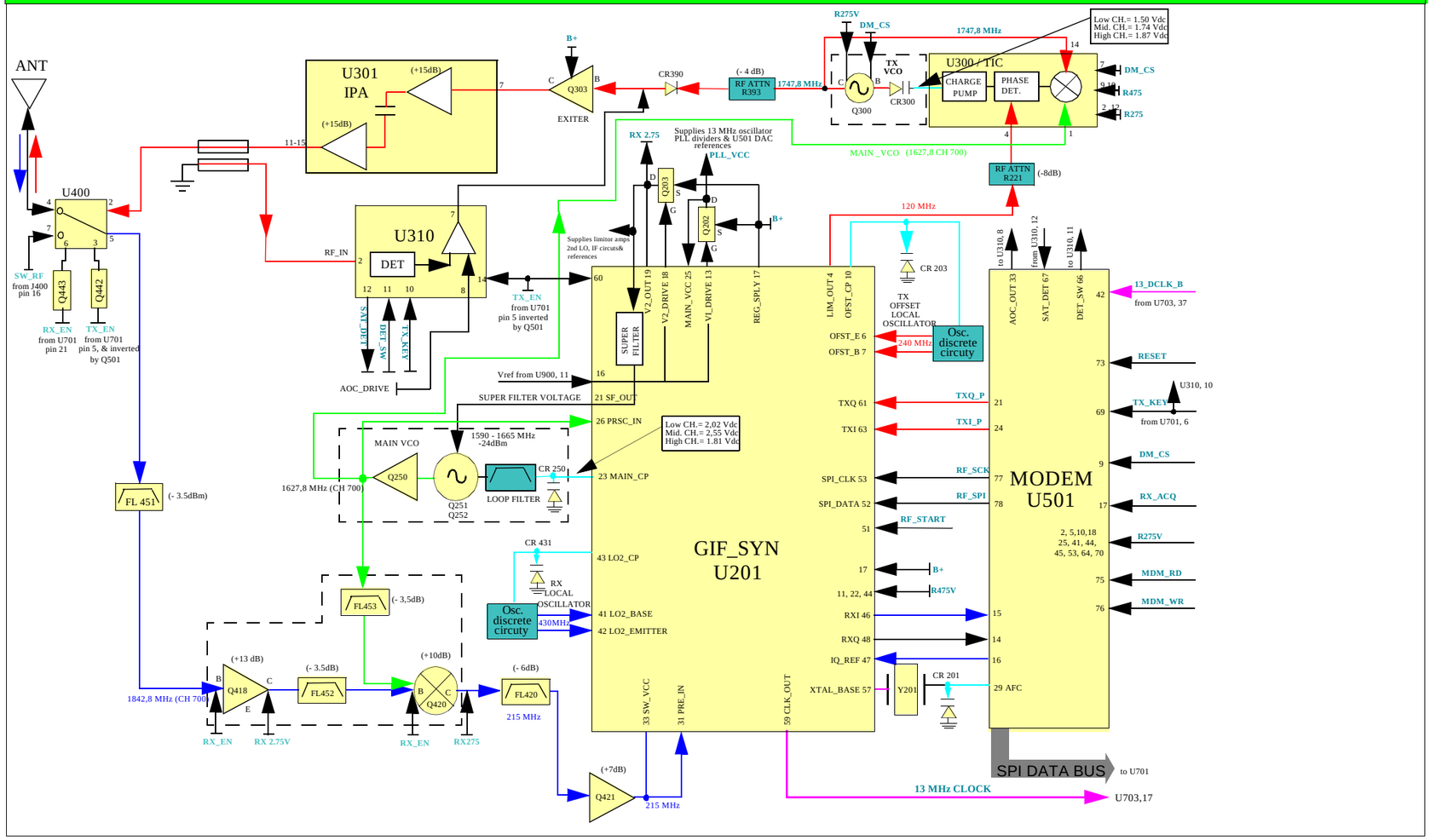
Level 3 Authorised

REVISIONS

Europe Middle East & Africa Customer Services	03.07.98
LEVEL 3 COLOUR DIAGRAMS	Rev. 1.2
DCS StarTAC	
Colin Jack, Michael Hansen, Billy Jenkins, Ralf Lorenzen	Page 1 of 2

Motorola Confidential Proprietary

DCS StarTAC RF BLOCK DIAGRAM



RF BOARD SIGNALS

Tx SIGNALS - 11062#, 1215#, 310#

Frequency 217Hz - 1ms/cm

SAT_DET	3Vpp	Signal from PAC to Speech Coder. When PA is at or near saturation signal is low, telling Speech Coder to reduce AOC drive When the PA is not near saturation this is high, telling Speech Coder to increase AOC drive.
DET_SW	Power Step: 04-11 - 50mVpp 12-15 - 900mVpp	Signal from the Speech Coder to the PAC When this signal is low, the internal gain in the PAC is unity. When this signal is high, the internal gain in the PAC is 1.
TX_KEY	2,75Vpp	From uP to PAC. This is a timing signal to the PAC to provide the current path for the initial loop precharge
AOC	Power Step: 04 - 520mVpp 15 - 280mVpp	Signal from SMOC to PAC. This is a linear control voltage for ramp up and ramp down of the PA output level. This controls the voltage on the exciter control output (EXC) from the PAC.
TX_EN	3Vpp	Signal from uP but inverted via Q502 and used to time:- 1. GIF SYN 2. TIC 3. RF Switch Enables Tx Path when high
DM_CS	2,8Vpp	Signal from uP inverted via Q504. Enables TX VCO. When high, this enables Tx path.
TXI	2.1Vpp	From Speech Coder IC to GIF SYN This signal is the in-phase input to the I-Q Modulator of the GIF SYN.
TXQ	2.1Vpp	From Speech Coder IC to GIF SYN This signal is the quadrature input to the I-Q Modulator of the GIF SYN.

Modem Callprocessor Interface

MDM_RD	2,8Vpp 500us/cm	From uP to SSpeech Coder. This signal indicates when the uP is reading data from the Speech Coder. High when enabled.
MDM_WR	2,8Vpp 500us/cm	From uP to Speech Coder. This signal indicates when the uP is writing data to the Speech Coder. High when enabled.

Rx SIGNALS - In Standby Mode

RX_ACQ	2,8Vpp 500us/cm	From uP to Speech Coder This is an interrupt from the uP to the Speech Coder. When high this indicates to the Speech Coder the beginning of the receive burst.
RF_START	2,8Vpp 20us/cm	From uP to GIF SYN Signal to drive the GIFSYN IC. This is a pulsed signalwhich controls the sending of SPI data to the GIFSYN for all RF functions.-

Rx SIGNALS - 11062#, 262000#, 25013#, 241#

Frequency 217Hz - 1ms/cm

RXI	1.8Vpp 500us/cm	From GIF Syn to Speech Coder IC. This is a baseband analogue signal to A/D convertors of Speech Coder
RXQ	1.8Vpp 500us/cm	From GIF Syn to Speech Coder IC. This is a baseband analogue signal to A/D convertors of Speech Coder
IQ_REF	1.38Vrms 500us/cm	From Speech Coder to GIF Syn. This is a DC level from Speech coder for the RXI and Q signals to ride on.

Europe, Middle East & Africa Customer Services

Level 3 Authorised

RF LAYER - ORDERABLE SPARES

Designator	Description	Number	Designator	Description	Number
CR201	Master Xtal Varactor	4809641F04	Q303	Tx Exciter Transistor	4809527E19
CR203	Tx Local VCO Varactor	4809641F03	Q442	Rf Switch Control Transistor	4809939C08
CR250	Main VCO Varactor	4809641F02	Q443	Rf Switch Control Transistor	4809939C08
CR300	Tx VCO Varactor	4809612F03	Shield 30	Top of Frontend / Antenna Switch	2609225D01
CR390	Transmit Diode	4809948D10	Shield 31	Top of Main VCO / FL420	2609226D01
CR431	Rx Local VCO Varactor	4809641F03	Shield 32	Top of TIC / TX VCO	2609227D01
CR908	Signal Indicator LED	4809118D01	Shield 33	Top of GIFSYN	2609228D01
FL420	IF Saw Filter	9109179E01	Shield 34	Top of PA	2609229D01
FL451	1st Rx Filter	9109068E02	Shield 35	Top of Modem	2609230D01
FL452	2nd Rx Filter	9109155K01	SH60 - 63	Clips Ext. Battery Flexprint	4209388S01
FL453	VCO Filter	9109068E01	U201	GIF SYN	5109632D92
Q202	Receive Power Transistor	4809579E18	U300	TIC	5109632D94
Q203	GIF SYN Power Transistor	4809579E18	U301	PA	5109908K31
Q300	Tx VCO Transistor	4809940E01	U310	PAC	5109632D08
Q418	Rx Amplifier Transistor	4809527E20	U401	Rf Switch	5109572E03
Q420	Rx Mixer	4809940E01	U501	Modem	5199281C03

TEST COMMANDS

# press 2 sec.	Enter Manual Test Mode
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22 #	Display SW Version Number of Speech Coder
25 #	Set Continuous AGC
26xxxx #	Set Continuous AFC
31x #	Initiate Pseudo-Random Sequence with Midamble
33xxx #	Synchronize to BCH Carrier
36 #	Initiate Acoustic Loopback
37 #	Stop Test
45xxx #	Serving Cell Power Level
46 #	Display Current Valure od AFC DAC
47x #	Set Audio Volume
58 / xxxxxx #	Display / Modify Security Code
59 / xxx #	Display / Modify Lock Code
60 #	Display IMEI
7100 #	Display Error Code

RX SIGNAL PATH
TX SIGNAL PATH
MAIN VCO SIGNAL PATH
TUNING VOLTAGES
REFERENCE CLOCK
Orderable Part
Non - Orderable Part

FREQUENCIES

CHANNEL	Tx	Rx	MAIN VCO	Rx I.F	Rx I.F L.O	Tx I.F	Tx I.F L.O
512-Low	1710	1805	1590	215	430	120	240
700-Middle	**1747,8**	**1842,8**	**1627,8**	**215**	**430**	**120**	**240**
885-High	1785	1880	1665	215	430	120	240

REVISIONS

Europe Middle East & Africa Customer Services	03.07.98
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DCS StarTAC	
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GSM EFR ALEX_P4

GSM EFR TRANSCEIVER BOARD
ALEX
SHEET 1

ISS.	COMMENTS	DATE
P1	COPIED FROM GSM RIE COSMO ISS D	4/5/98
P2	COPIED FROM GSM RIE COSMO ISS A	7/22/98
P3	LOGIC CHANGES	9/8/98
	Differences between StarTAC, Cosmo and Dual Slot StarTAC (Alex)	

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AUXILLIARY BATTERY CONNECTION

PLACE AT ZIF CONNECTOR

SECURE EPROM

SIM INTERFACE

SIM INTERFACE

CLK PATH
DSP/SYN > BIC > MODEM
i.e. SC

PLOT WITH SCALE OF 8.7

BOARD FIDUCIALS

REVISIONS

Europe Middle East & Africa Customer Services	08.01.99
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GSM EFR ALEX	
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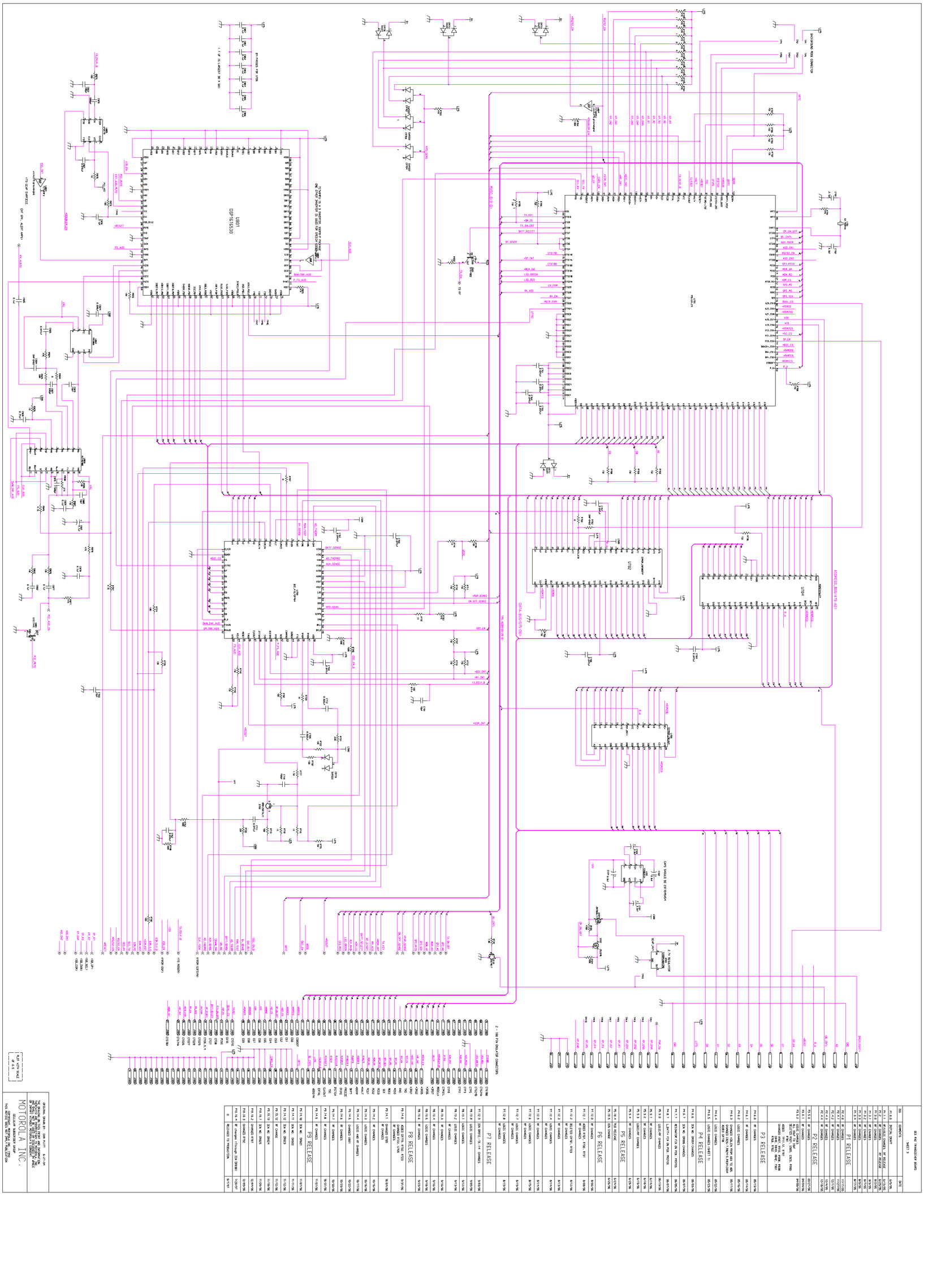

GSM EFR ALEX_P4

GSM EFR TRANSCEIVER BOARD
ALEX
SHEET 3

ISS.	COMMENTS	DATE
P1	COPIED FROM GSM RAE COSMO ISS 0	4/29/98
P2	COPIED FROM GSM RAE COSMO ISS 1	7/22/98
P3	LOGIC CHANGES	9/03/98
	Differences between StarTAC Cosmo and Dual Slot StarTAC (Alex)	

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Level 4 Authorised

U701 Pollux_C4

U704 *RAM1CS *RAM2CS

U705 EEPROM *ROM2CS *ROM20E

U702 EPROM *ROM1CS *ROM0E

U703 BIC_4.2

U801 DSP 1627

U802

ADDRESS_BUS(A19:A0)

DATA_BUS(D15:D0)

MISC_O(5:0)

TPU_ADDRESS(2:0)

13_DCLK_B

2 - 100 PIN EMULATOR CONNECTORS

BACKGROUND MODE CONNECTOR

BY-PASSES FOR UTDS

(.1 UF IS LARGEST 30 X 60)

(TO SCAP EARPIECE, EXT SPK, ALERT APPS)

PLOT WITH SCALE OF 0.7

REVISIONS

Europe Middle East & Africa Customer Services	08.01.99
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GSM EFR ALEX	
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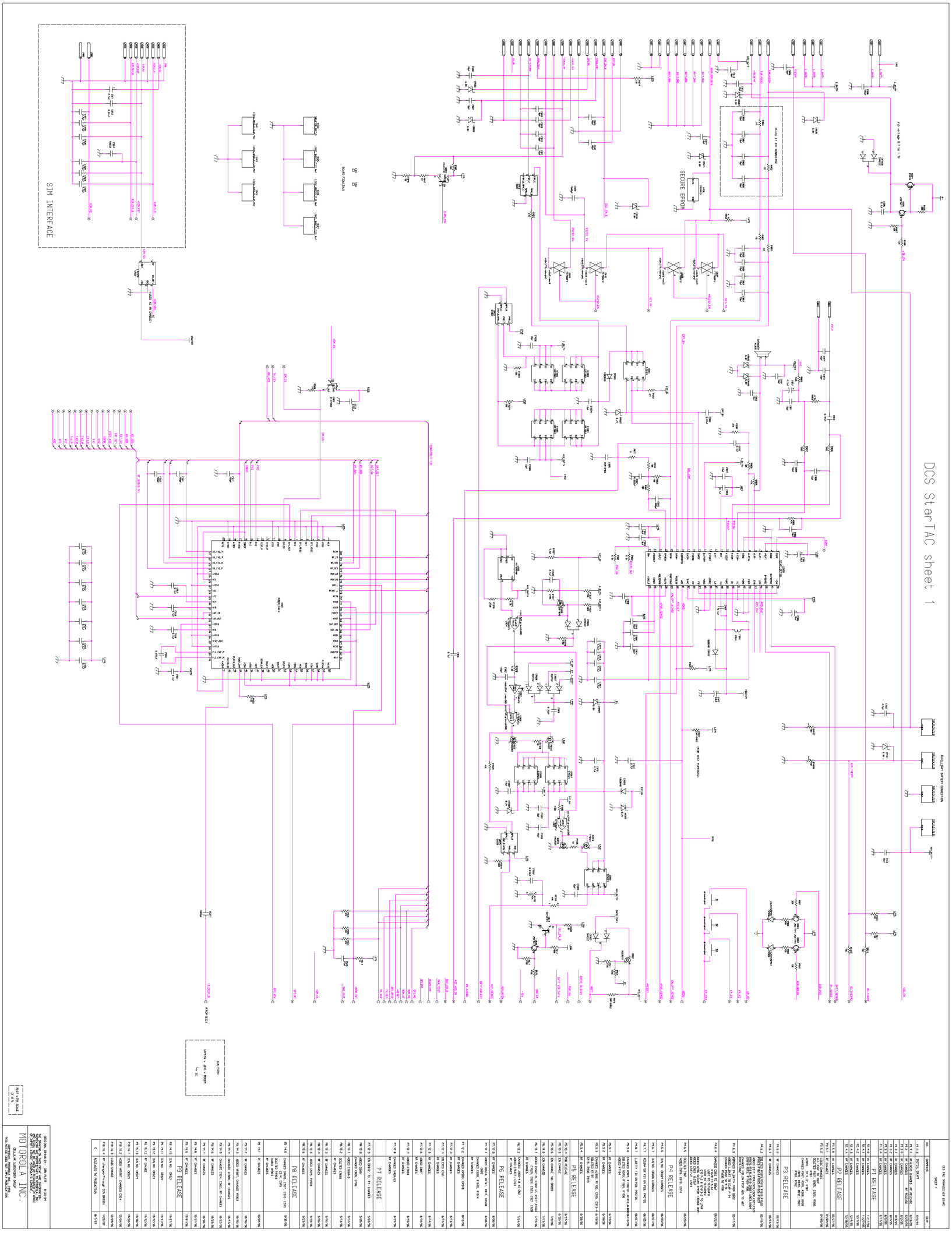
SIM INTERFACE
SECURE EPROM
DCS StarTAC sheet 1
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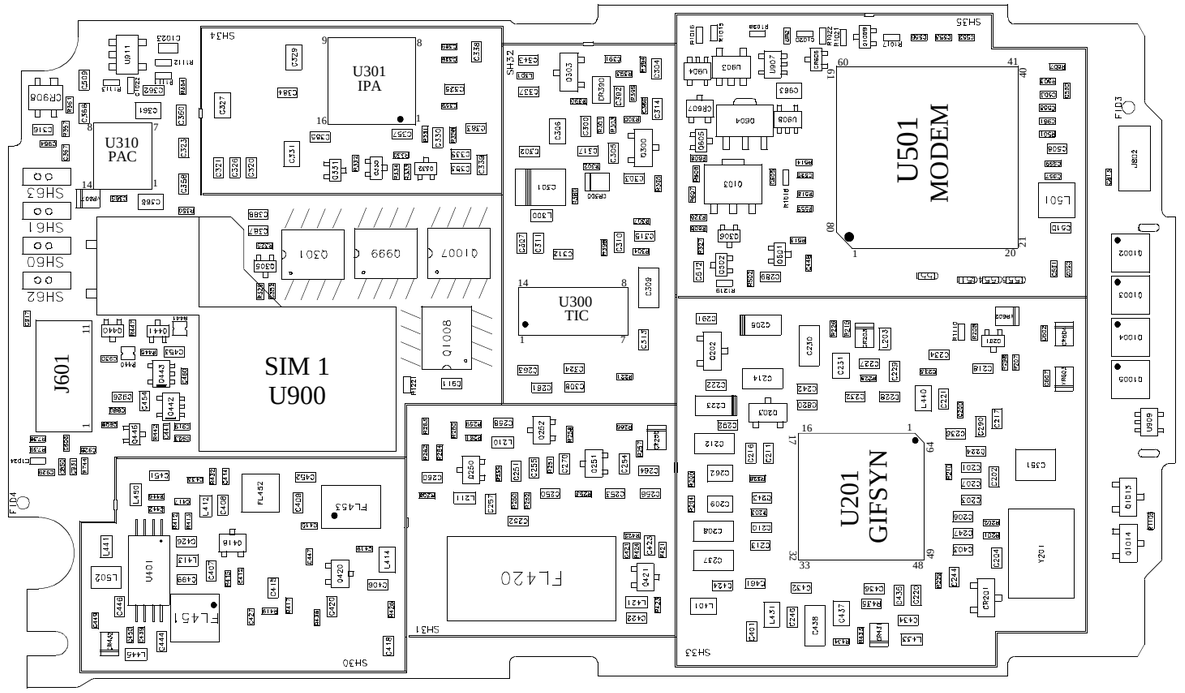
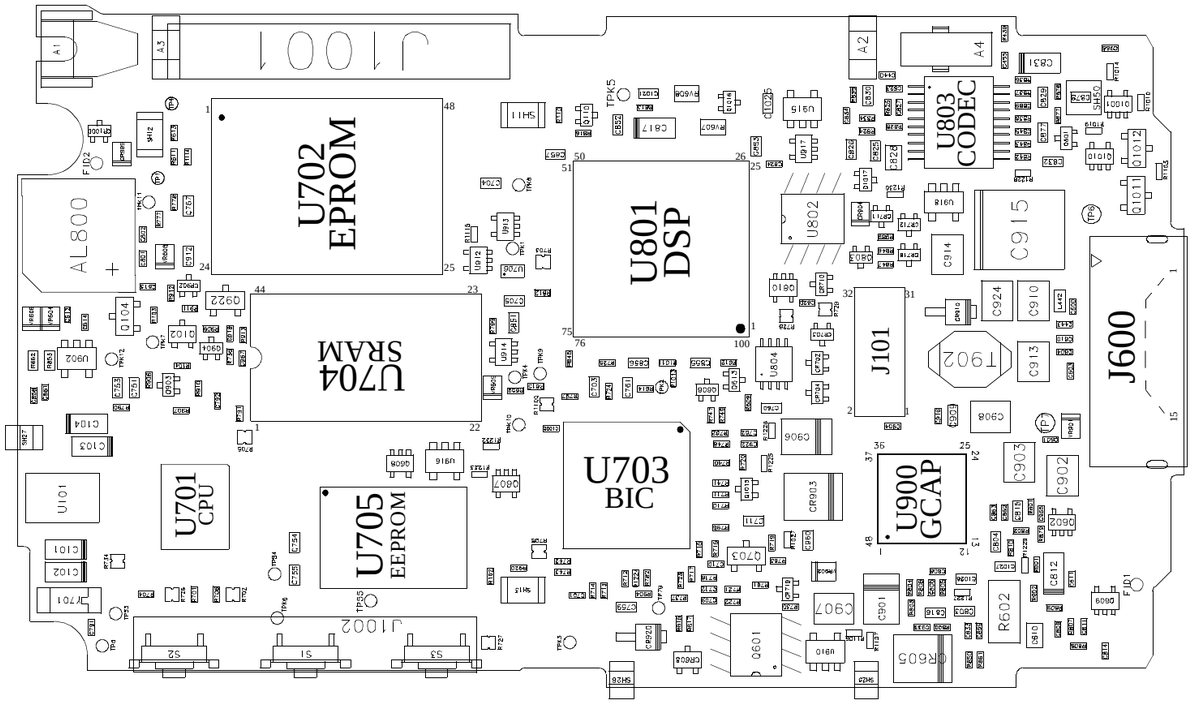
GSM EFR ALEX_P4





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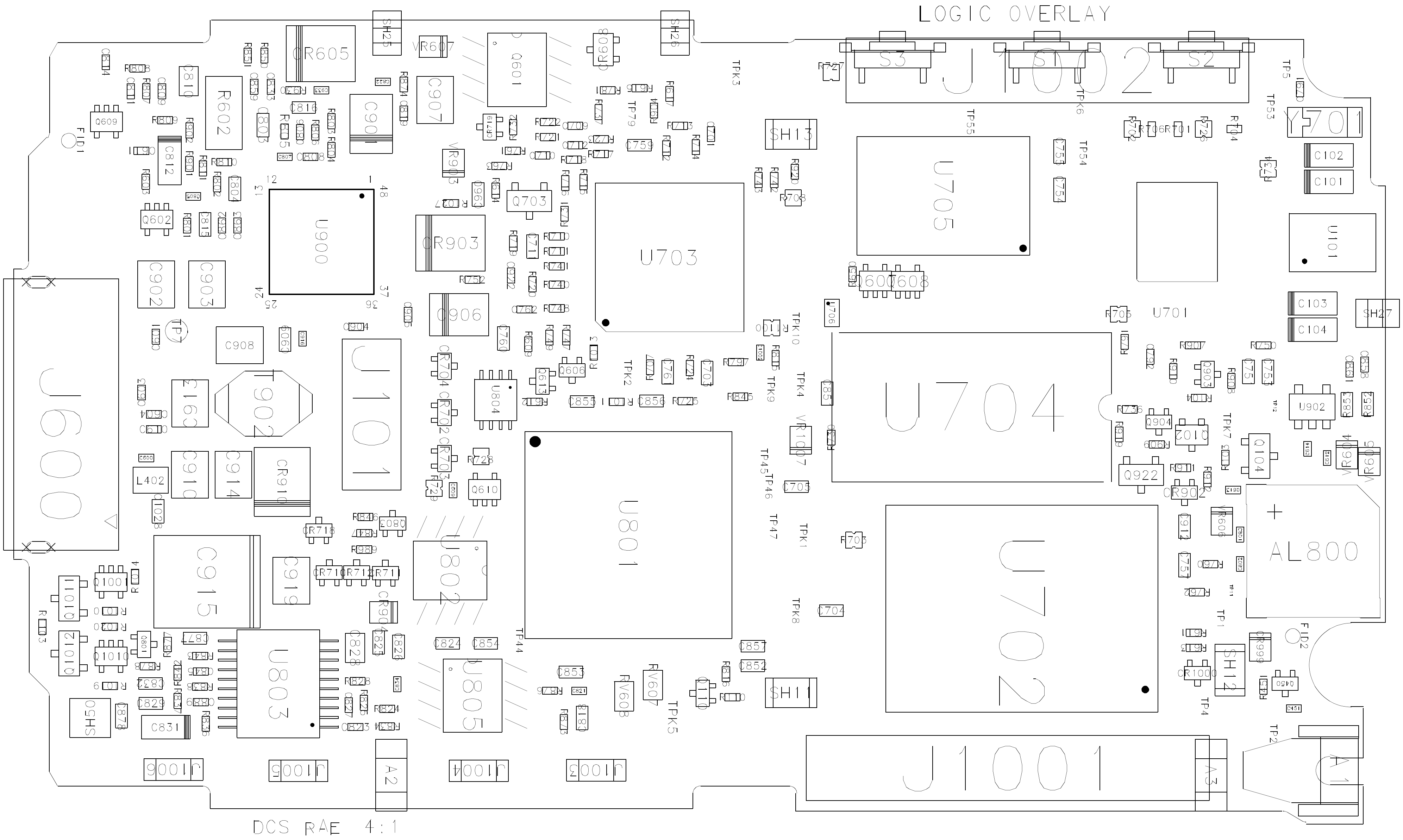
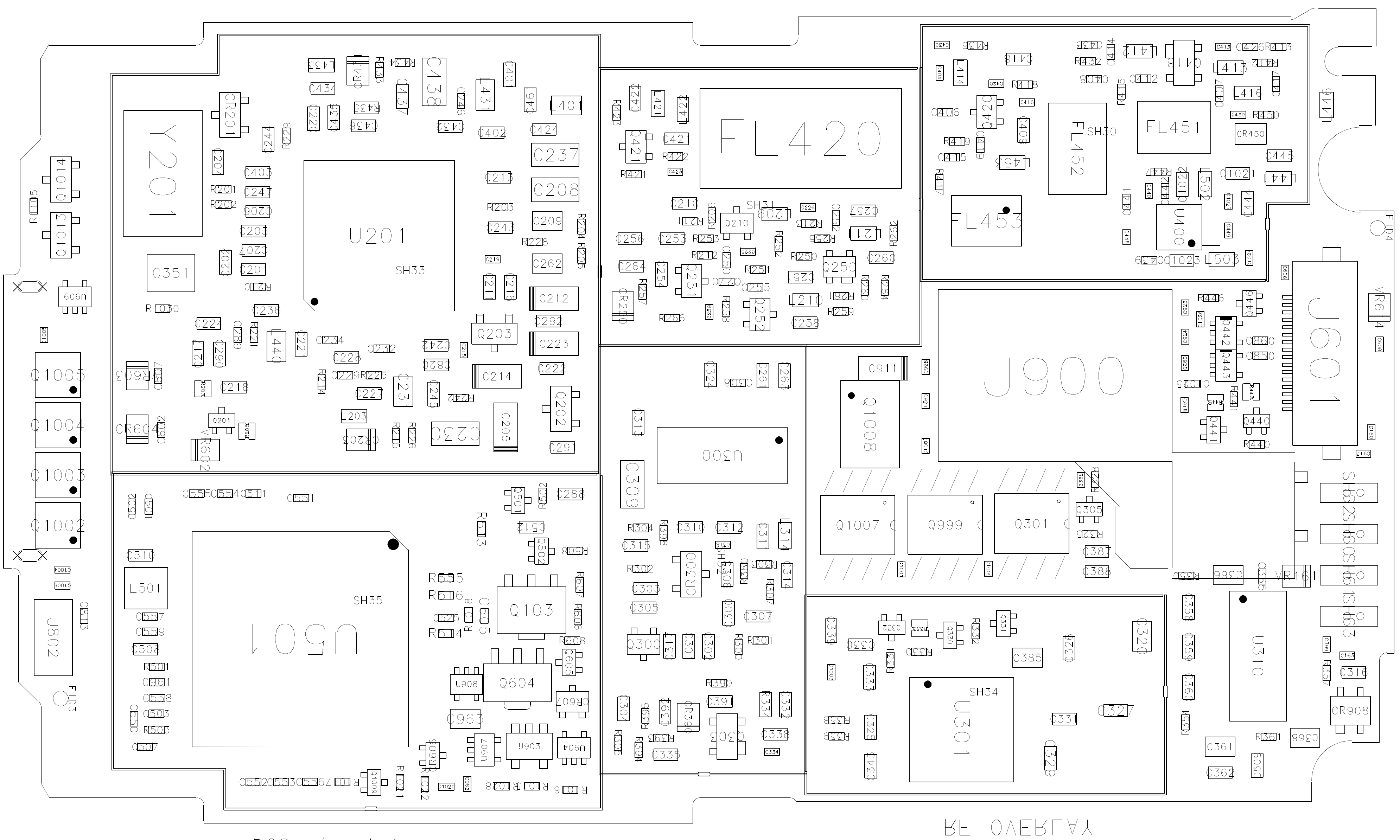


84D09336E01
DATE: 08/12/97

DCS RAE 4:1
ISSUE: 0
TIME: 5:00PM

DCS StarTac_P10

Page 2

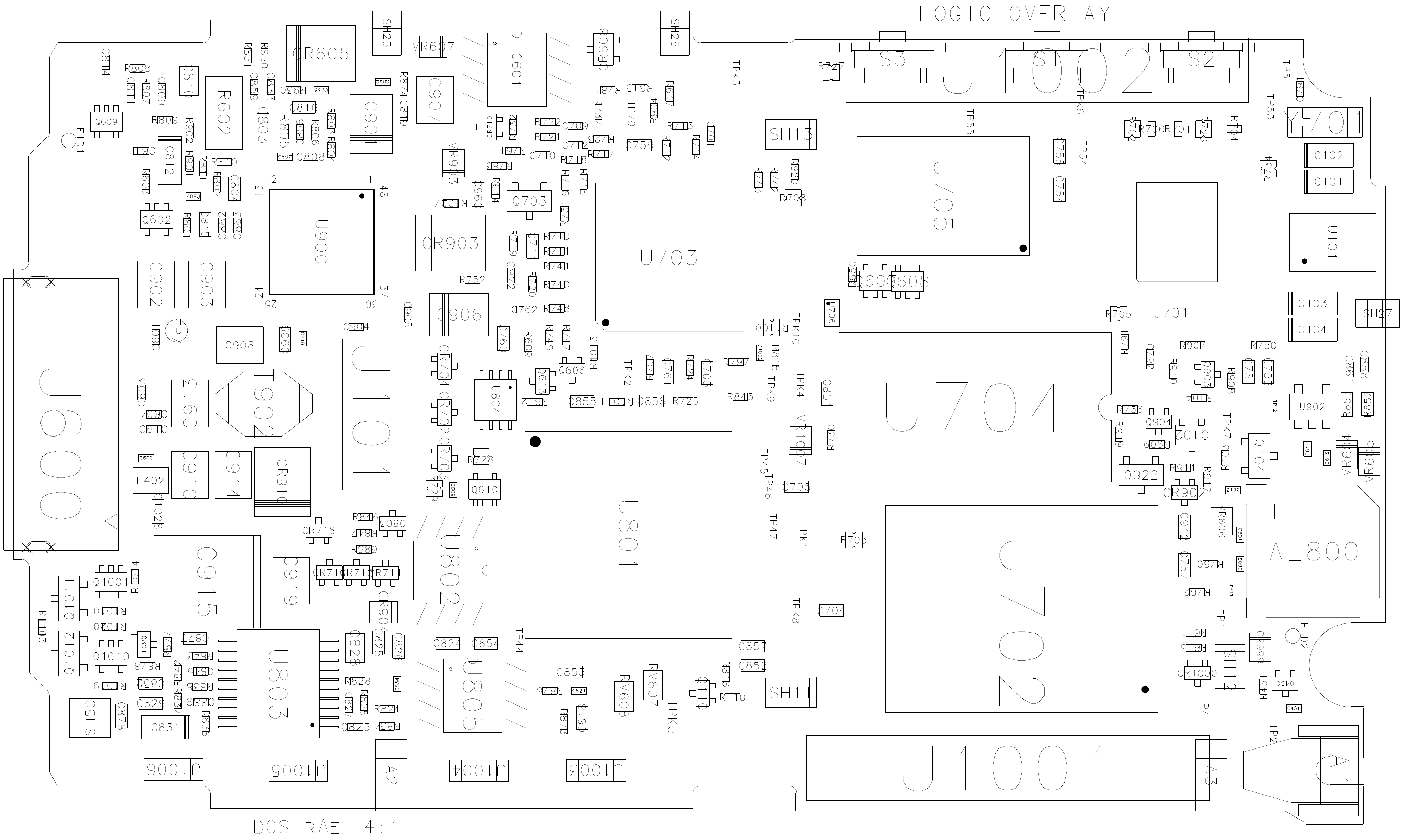


84D09336E01
DATE: 08/12/97

DCS RAE 4:1
ISSUE: 0
TIME: 5:00PM

DCS StarTac_P10

Page 1

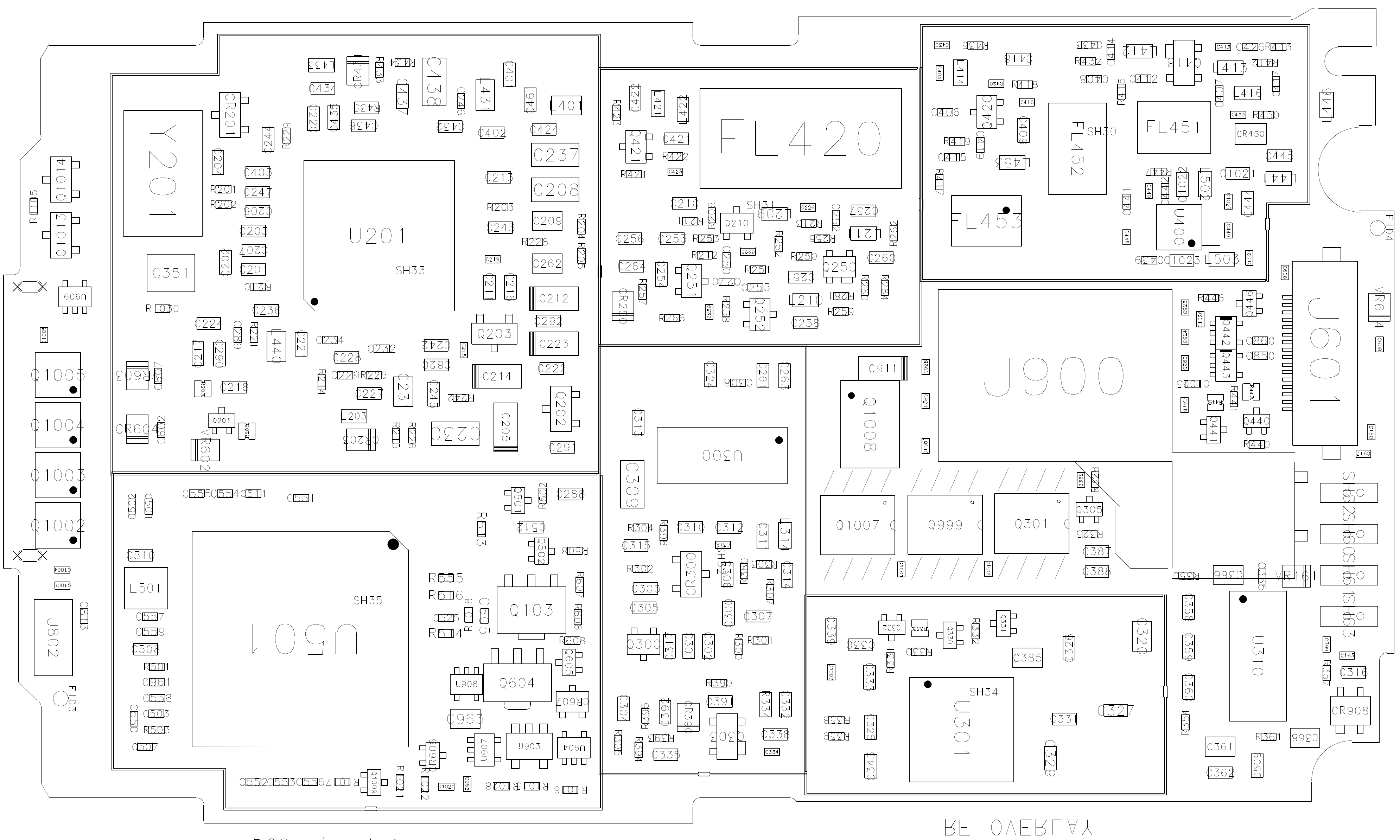


84D09336E01
DATE: 08/12/97

DCS RAE 4:1
ISSUE: 0
TIME: 5:00PM

DCS StarTac_P10

Page 2



84D09336E01
DATE: 08/12/97

DCS RAE 4:1
ISSUE: 0
TIME: 5:00PM

GSM EFR ALEX_P4

GSM EFR TRANSCEIVER BOARD

SHEET 2

ISS.	COMMENTS	DATE
P1	COPIED FROM GSM RAE DESMO ISS D	4/5/98
P2	COPIED FROM GSM RAE DESMO ISS A	7/22/98
P3	LOGIC CHANGES	9/03/98

DUAL RF SWITCH

LNA

REC. FRONT END

MIXER

ISO. AMP

NOTE:
All other connections are ground.

947.4Mhz

794.4Mhz

153Mhz

902.4Mhz

108Mhz

RX275

TX_EN

RX_EN

FX_EN

SW_RF

RF_START

COMPONENTS IN THIS AREA CAN BE OPTIONALLY PLACED IN VCO CAN SPACE PERMITTING.

C257 AND C251 SHOULD BE CLOSE TO L211 AND L210 RESP.

VCO

PA BIAS CONTROL

PA OUTPUT MATCH

IPA

PA INPUT MATCH

TX_ATTENUATOR

TX_VCO

20 dB Coupler

U201

U300

U301

U310

U911

RXQ

IQ REF

RXI

TXQ_P

TXQ_M

TXI_P

TXI_M

CLK_13IN

AFC

RF_SPI

RF_SCK

VREF

SAT_DET

DET_SW

TX_KEY

AOC

V1 IS DIRTY

V2 IS CLEAN

PLOT WITH SCALE OF 0.7

Europe, Middle East & Africa Customer Services

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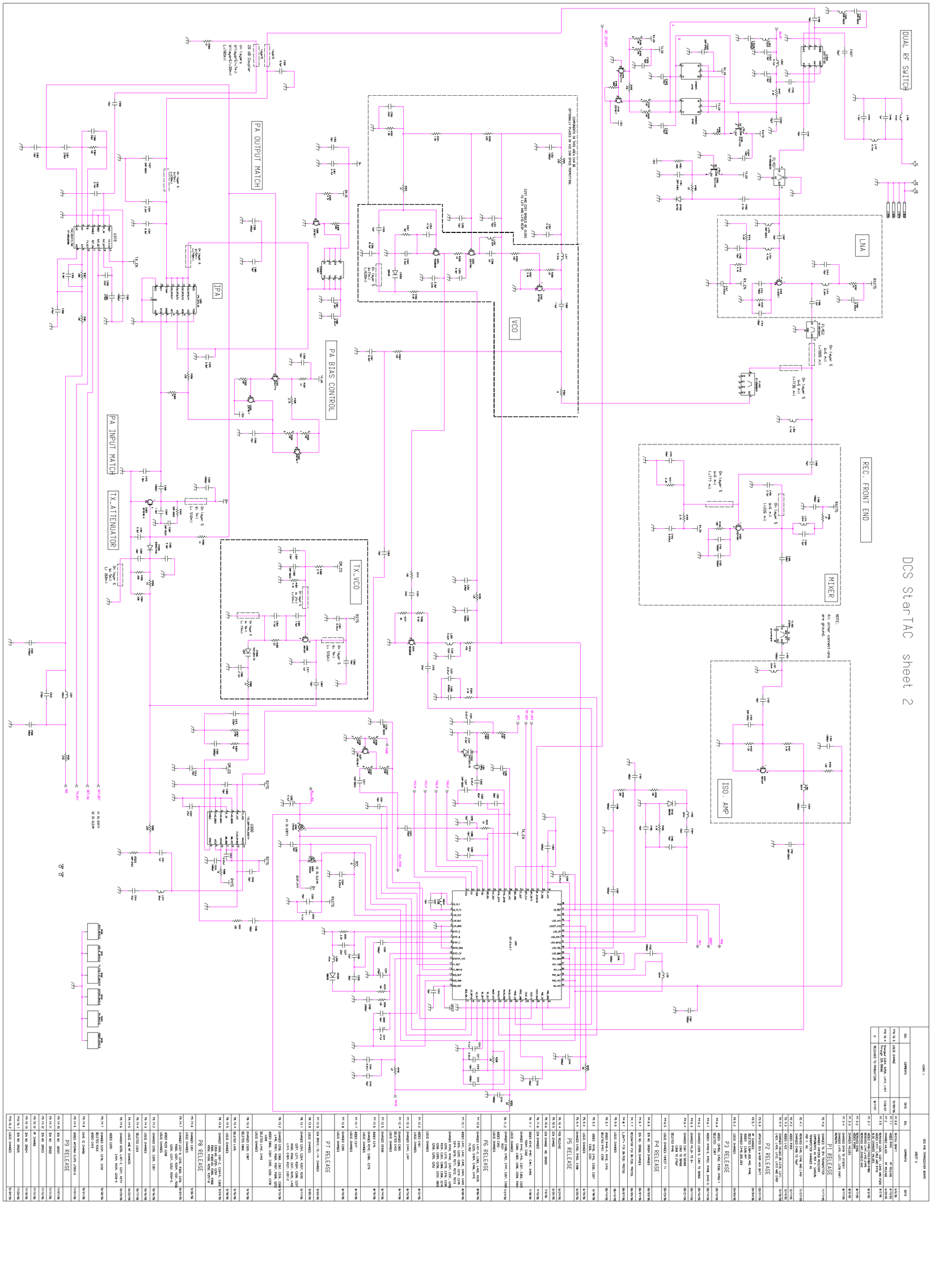
DUAL RF SWITCH
LNA
VCO
PA BIAS CONTROL
PA OUTPUT MATCH
PA
PA INPUT MATCH
TX_ATTENUATOR
TX_VCO
MIXER
REC. FRONT END
ISO. AMP
DCS StarTAC Sheet 2
P1 RELEASE
P2 RELEASE
P3 RELEASE
P4 RELEASE
P5 RELEASE
P6 RELEASE
P7 RELEASE
P8 RELEASE

GSM EFR ALEX_P4

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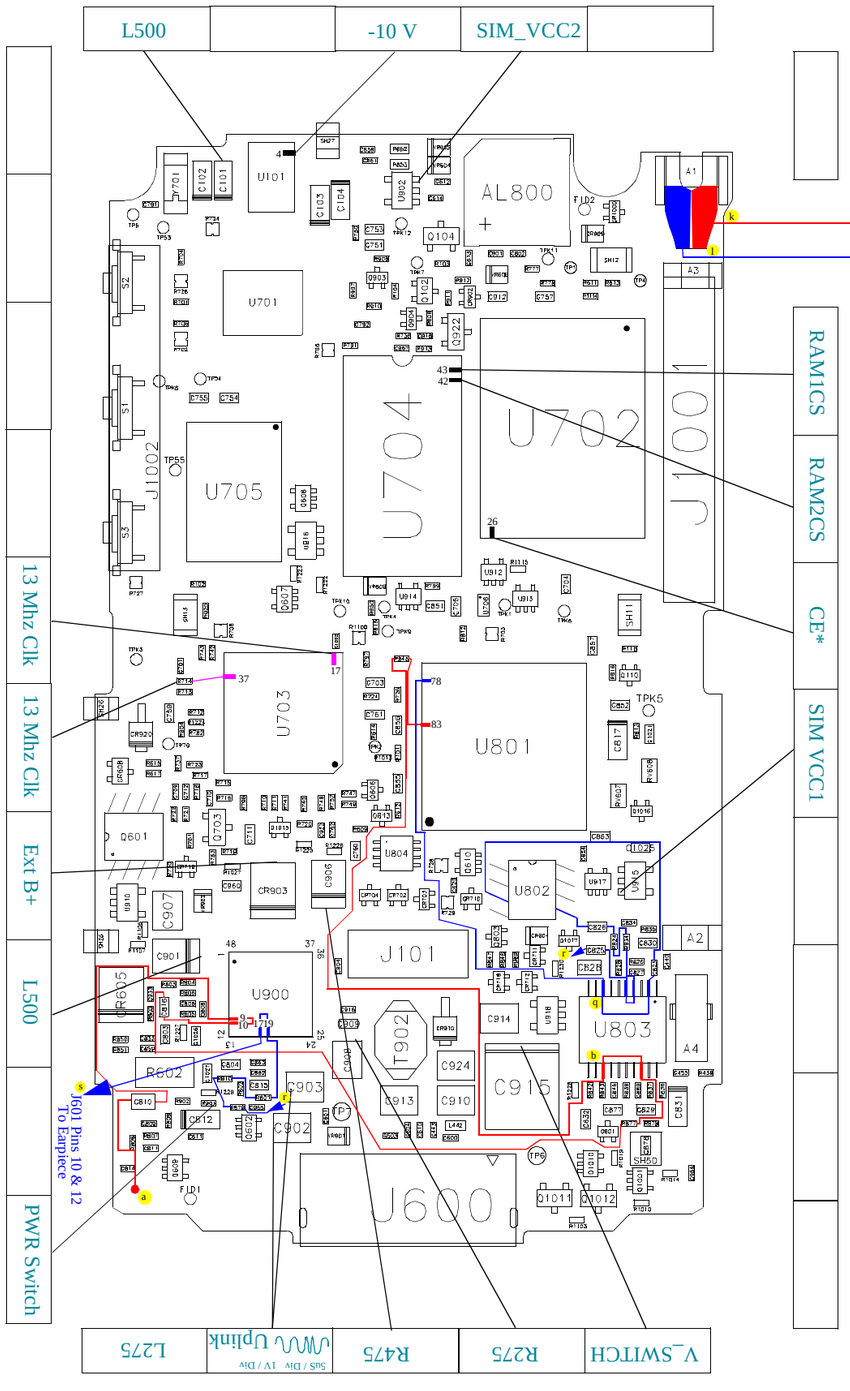
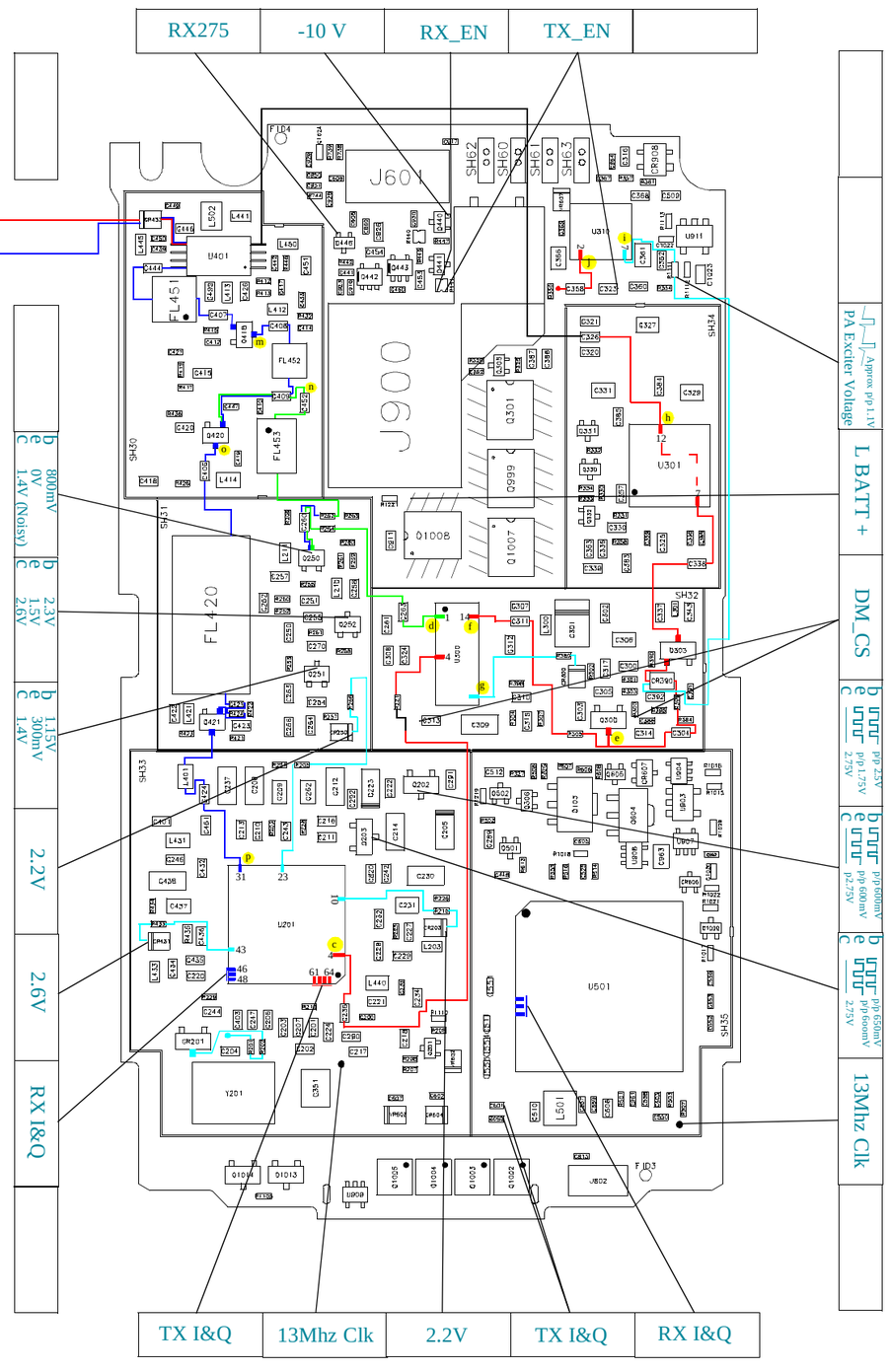
J600

PIN	SIGNAL
1	RF GND
2	SW_RF
3	RF GND
4	BATT_FDBK
5	MAN_TEST
6	RS232_TX
7	RS232_RX
8	RS232_EN
9	AUDIO OUT
10	GND
11	UPLINK
12	DOWNLINK
13	DSC_EN_B
14	EXT B+
15	GND

J101

PIN	SIGNAL
1	KP_R3
2	Backlight +
3	A0
4	PWR_SW
5	D4
6	*RESET
7	KP_R2
8	D7
9	D0
10	D5
11	D6
12	D3
13	KP_R5
14	D1
15	-10V
16	L275
17	KP_EN1
18	D2
19	KP_R4
20	KP_EN4
21	DP_EN
22	KP_EN5
23	BL_CNTL
24	GND
25	KP_R1
26	GND
27	KP_EN3
28	GND
29	KP_EN2
30	GND
31	R/W
32	GND





*All Readings read during transmit mode on Channel 62 at Power level 05.

*J1001 and J1002 - Same as Startac Cosmo

TX Path

a. Mic i/p (analogue)
b. Digital Audio
c. 108Mhz Tx IF
d. 794.4Mhz Main VCO o/p
e. Main 902.4Mhz Tx o/p
f. Main Tx o/p F/Back
g. Main Tx O/P Chg Pump
h. Amplified Tx o/p
i. Exciter Voltage from PAC IC
j. Main Tx F/Back to PAC IC
k. Main Tx o/p Antenna.

Rx Path

l. Main Rx 947.4Mhz i/p
m. Amplified Rx signal
n.Main 794.4Mhz VCO i/p
o. 153Mhz Rx IF
p. 153Mhz Gifsyn i/p
q. Digital Audio
r. Analogue Audio
s. Amplified Audio to Speaker

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Updated: 29th Jun 1998
Ver 1.0

DCS StarTAC

AL LAYER - ORDERABLE SPARES

Part Designa-tor	Part Description	Part Number	Part Designator	Part Description	Part Number
A2 / A3	Ground clips Ant. tube	4209480E01	T902	Choke / Vswitch	2509306J01
AL800	Alert	5009473S01	U703	IC BIC	5109743E13
CR605	Diode / Charger	4809653F03	U704	IC SRAM	5109688L09
J101	32 Pin Display Connector	2809454C02	U801	IC Speech Coder	5199285C01
J600	15 Pin Extern Connector	0909449B04	U802	IC Multiplexer	5109632D44
J601	Flip Flexprint Connector	0909059E01	U803	Codec IC	5109920D15
J802	Microphone Connector	0909195E01	U804	IC Buffer	5109522E10
J900	SIM Connector	4009169E01	U805	IC Frquency Doubler	5109781E47
MIC	Microphone	5009536H15	U900	IC GCAP	5109632D69
Q501	Transitor TX_EN	4809607E05	Y701	XTAL 32.768KHZ	4809995L05
Q601	Power Transistor Charger	4809579E17	U702	Flashed Eprom (boot sector)	5102486T01
Q602	Transistor Batt Feedback	4809939C04	S1 - S3	Volume / Mute Switch	4009060E01
R602	Resisor / Charger Sensing	0680195M64	SH25 - 27	Ground Clips	4204774Z01

RF LAYER - ORDERABLE SPARES

tor			tor		
CR201	Master Xtal Varactor	4809641F04	Q303	Tx Exciter Transistor	4809527E19
CR203	Tx Local VCO Varactor	4809641F03	Q442	Rf Switch Control Transistor	4809939C08
CR250	Main VCO Varactor	4809641F02	Q443	Rf Switch Control Transistor	4809939C08
CR300	Tx VCO Varactor	4809612F03	Shield 30	Top of Frontend / Antenna Switch	2609225D01
CR390	Transmit Diode	4809948D10	Shield 31	Top of Main VCO / FL420	2609226D01
CR431	Rx Local VCO Varactor	4809641F03	Shield 32	Top of TIC / TX VCO	2609227D01
CR908	Signal Indicator LED	4809118D01	Shield 33	Top of GIFSYN	2609228D01
FL420	IF Saw Filter	9109179E01	Shield 34	Top of PA	2609229D01
FL451	1st Rx Filter	9109068E02	Shield 35	Top of Modem	2609230D01
FL452	2nd Rx Filter	9109155K01	SH60 - 63	Clips Ext. Battery Flexprint	4209388S01
FL453	VCO Filter	9109068E01	U201	GIF SYN	5109632D92
Q202	Receive Power Transistor	4809579E18	U300	TIC	5109632D94
Q203	GIF SYN Power Transistor	4809579E18	U301	PA	5109908K31
Q300	Tx VCO Transistor	4809940E01	U310	PAC	5109632D08
Q418	Rx Amplifier Transistor	4809527E20	U401	Rf Switch	5109572E03
Q420	Rx Mixer	4809940E01	U501	Modem	5199281C03
Q421	Rx Pre-Amplifier Transistor	4809940E01	Y201	Master Xtal - 13MHz	4809277D01

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Alex / Cosmo Electrical Differences

SWF0246BB (ALEX) SWF2529EB(COSMO)

With Reference to GCAP / Modem Schematic

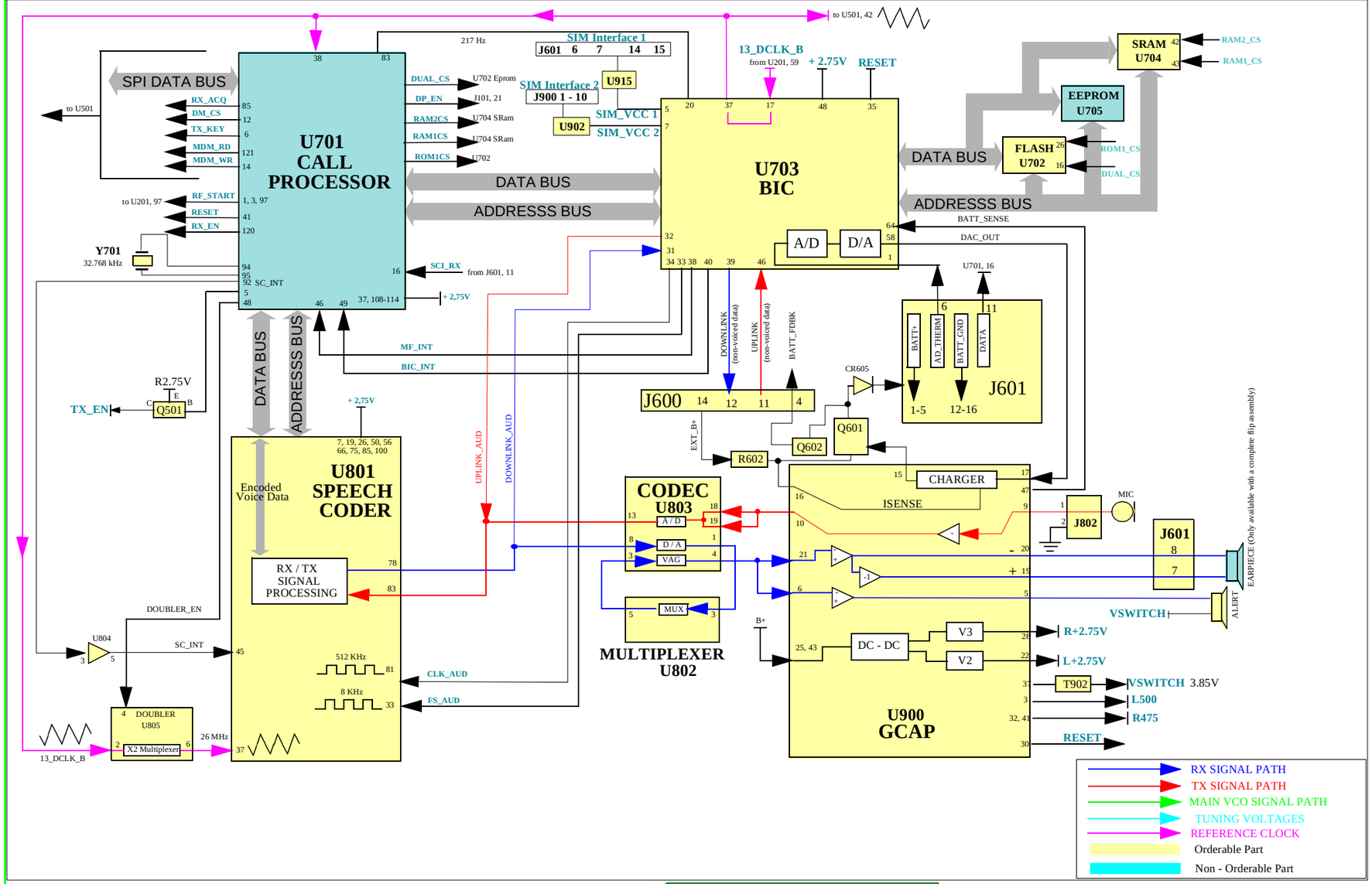
Part Number	CCt Reference Designator
0662057M50	R799
0662057M51	R744
0662057M74	R1229
0662057M92	R725
0662057M98	R1227
0662057N23	R1230
0662057M01	R507
0662057M26	R1219
0662057M92	R739
21137432E20	C1026
21137432E20	C1027
2113928A01	C1025
2113741F49	C926
2113743L17	C1024
2113743N12	C928
2113743N12	C929
2113743N12	C930
2113743N34	C931
2113928A01	C911
4809605E02	Q1015
4809608E03	Q1017
4809653F02	CR920
5109512F02	U918
5109522E22	U917
5109781E50	U915
0909201T01	J601

With Reference to Logic Schematic

Part Number	CCt Reference Designator
0662057M92	R725
0662057N10	R1226
0662057N39	R1225
5109522E15	U914
5109962C11	U703

*NB These differences are main differences only. i.e.Components which are present on one product but not on another,or main IC changes, not value changes in descreet components

GSM DualSlot StarTAC Audio Logic Block Diagram



RX SIGNAL PATH
TX SIGNAL PATH
MAIN VCO SIGNAL PATH
TUNING VOLTAGES
REFERENCE CLOCK
Orderable Part
Non - Orderable Part

LOGIC BOARD SIGNALS

Measured in standby mode

RX_EN	2.8mVpp 10ms / cm	From the CPU (U701). When high, Rx path enabled and low muted. 1. Enables the Rf switch (U400) for receive mode. 2. Biases the mixer Q420, and low noise amp (Q418).
TX_EN	7Vpp 10ms / cm	From CPU (U701), but inverted by Q501. High when 1. Enable the Rf switch for transmit mode & also the GIFSYN for transmit mode. 2. Supply Voltage for the PAC IC. 3. Isolates RF, by switching the PA Bias Circuitry (Not shown).
RESET	power on 2,8Vrms 200ms / cm	Controlled at power up by GCAP (U900) & CPU (U701). 1. Connected to CPU (U701), BIC (U703), Modem (U501) & Speech coder (U801). After power up sequence, any chip can hold RESET low to power phone off if there is a problem.
DUAL_CS	2.8Vpp 100ns / cm	From CPU (U701) to Eprom. 1. Chip Enable controlling read/write access to and from Eprom (U702).
RAM1_CS	2.8Vpp 100ns / cm	From CPU (U701) to SRAM. 1. Chip Enable controlling read/write access to and from 1st half of SRAM (U704).
RAM2_CS	2.8Vpp 100ns / cm	From CPU (U701) to SRAM. 1. Chip Enable controlling read/write access to and from 2nd half of SRAM (U704).
ROM1_CS	2.8Vpp 100ns / cm	From CPU (U701) to Eprom. 1. Chip Enable controlling read/write access to and from Eprom (U702).
DP_EN	start up or press key 2.8Vpp 100ns / cm	From CPU (U701) to display, via connector J101. 1. Processor selects to enable display. When high, the display is enabled and low disabled.
SC_INT	start up or press key 2.8Vpp 2ms / cm	Speech Coder Interface. This is a signal from uP (U701) to Speech Coder (U801). 1) This is a 20ms timing signal from U701 which times the decoding and encoding function of the Speech Coder U801.
Doubler_EN	power on 2.8vpp 100ms / cm	From CPU (U701) to Clock Doubler U805. 1) This signal enables the Clock Doubler U805 which doubles the 13MHz clock to 26MHz to time the Speech Coder. When high U805 is enabled and low disabled.
MF_INT	2.8Vpp 1ms / cm	From BIC to uP. This signal periodically interrupts the uP at 217Hz. During Power Saving mode this signal is set to DC.
BIC_INT	press a key 2.8Vpp 50us / cm	From BIC to uP. This signal interrupts the uP for a number of reasons. 1. Keypad detection 2. Power Sense 3. SIM Functions 4. DSC Bus Status Indicators
UPLINK	2.8Vpp 10us / cm	From butt plug (J600) to BIC chip (J600). This is a comms link from an external peripherale and the phone, and could be either data information or speech information. It is also used to sense the presence of a DHFA and the ignition status of the DHFA with DC levels
DOWNLINK	5Vpp 10us / cm	From BIC chip (U703) to butt plug (J600).This is a comms link from an external peripherale and the phone, and could be either data information or speech information. It is also used to sense the presence of a DHFA and the ignition status of the DHFA with DC levels
CLK_13_IN	1.6Vpp 50ns / cm	From GIF Syn to BIC IC - 13MHz clock.. This is the master clock reference required for the radio

Measured in test mode

AUDIO IN	test mode 08#, 10#, 36# 434#, 477# 2.7Vpp 5us / cm	External audio from butt plug, directly to Speech Coder IC
AUDIO OUT	test mode 08#, 10#, 36# 434#, 477# 2.8Vpp 5us / cm	External audio from Speech Coder via GCAP to butt plug
CLK_AUD	2.8Vpp 5us / cm	This signal is from the BIC to the Speech Coder It is a timing signal and runs at 512KHz, and times the transfer of speech information on the DSC Bus between BIC and Speech Coder.
FS_AUD	2.8Vpp 5us / cm	This signal is from the BIC to the Speech Coder IC. It is a timing signal at 8KHz and provides for frame synchronisation during speech transfer on the DSC bus.

A/L LAYER - ORDERABLE SPARES

Part Designator	Part Description	Part Number	Part Designator	Part Description	Part Number
A2 / A3	Ground clips Ant. tube	4209480E01	U703	IC BIC	5109962C11
AL800	Alert	5009473S01	U704	IC SRAM	5109688L09
CR605	Diode / Charger	4809653F03	U801	IC Speech Coder	5199305A01
J101	32 Pin Display Connector	2809454C02	U802	IC Multiplexer	5109632D44
J600	15 Pin Extern Connector	0909449B04	U803	Codec IC	5109920D19
J601	Flip Flexprint Connector	0909201T01	U804	IC Buffer	5109522E10
J802	Microphone Connector	0909195E01	U805	IC Frquency Doubler	5109781E47
J900	SIM Connector 2	4009169E01	U900	IC GCAP	5109632D69
MIC	Microphone	5009536H15	Y701	XTAL 32.768KHZ	4809995L05
Q501	Transitor TX_EN	4809607E05	U702	Flash Prom With Bootcode	5102486T01
Q601	Power Transistor Charger	4809579E17	S1 - S3	Volume / Mute Switch	4009060E01
Q602	Transistor Batt Feedback	4809939C04	SH25 - 27	Ground Clips	4209189E01
R602	Resistor / Charger Sensing	0680195M64	A1	Antenna Clip	4209233D01
T902	Choke / Vswitch	2509306J01			

= Differences Startac 100 to Dual band Startac

TEST COMMANDS

# press 2 sec.	Enter Manual Test Mode
01 #	Exit Manual Test Mode
07 #	Mute Rx Audio Path
08 #	Unmute Rx Audio Path
09 #	Mute Tx Audio Path
10 #	Unmute Tx Audio Path
11 #	Program Main Local Osc. to Channelbb
12 #	Set Tx Power level to fixed valure
19 #	Display SW Version Number of Call Processor
20 #	Display SW Version Number of Modem
22 #	Display SW Version Number of Speech Coder
25 #	Set Continuous AGC
26xxxx #	Set Continuous AFC
31x #	Initiate Pseudo-Random Sequence with Midamble
33xxx #	Synchronize to BCH Carrier
36 #	Initiate Acoustic Loopback
37 #	Stop Test
45xxx #	Serving Cell Power Level
46 #	Display Current Valure od AFC DAC
47x #	Set Audio Volume
58 / xxxxxx #	Display / Modify Security Code
59 / xxx #	Display / Modify Lock Code
60 #	Display IMEI

REVISIONS

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GSM Dual Slot Startac	
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Customer Services
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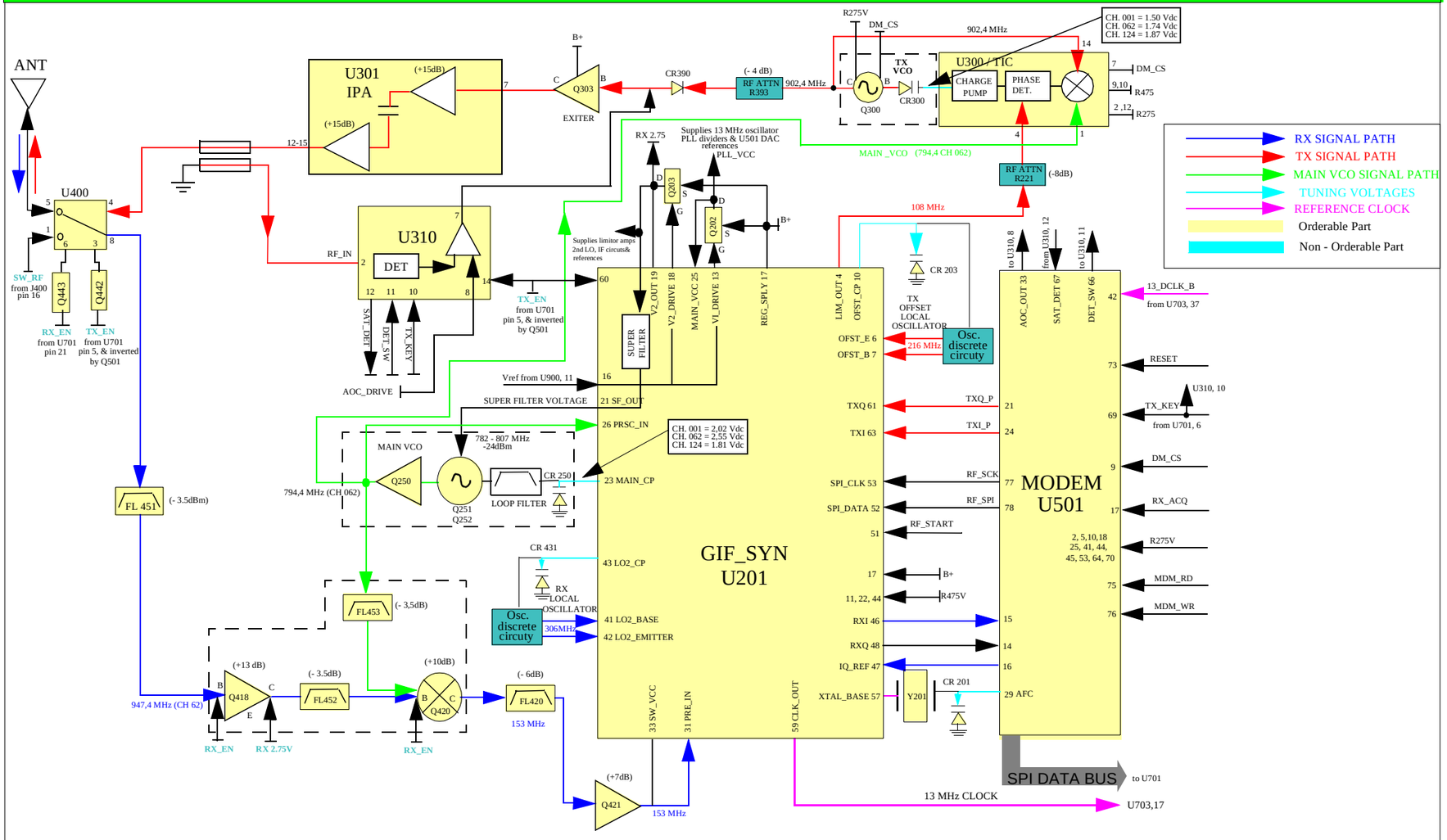
GSM Dual Slot StarTAC RF BLOCK DIAGRAM



RF BOARD SIGNALS

Tx SIGNALS - 110062#, 1215#, 310#

Frequency 217Hz - 1ms/cm

SAT_DET	3Vpp	Signal from PAC to Speech Coder. When PA is at or near saturation signal is low, telling Speech Coder to reduce AOC drive When the PA is not near saturation this is high, telling Speech Coder to increase AOC drive.
DET_SW	Power Step: 04-11 - 50mVpp 12-15 - 900mVpp	Signal from the Speech Coder to the PAC When this signal is low, the internal gain in the PAC is unity. When this signal is high, the internal gain in the PAC is 1.
TX_KEY	2,75Vpp	From uP to PAC. This is a timing signal to the PAC to provide the current path for the initial loop precharge
AOC	Power Step: 04 - 520mVpp 15 - 280mVpp	Signal from SMOC to PAC. This is a linear control voltage for ramp up and ramp down of the PA output level. This controls the voltage on the exciter control output (EXC) from the PAC.
TX_EN	3Vpp	Signal from uP but inverted via Q500 and used to time:- 1. GIF SYN 4. PAC 2. TIC 5. RF Switch 3. Tx VCO Enables Tx Path when high
DM_CS	2,8Vpp	Signal from uP inverted via Q504. Enables TIC, PA and TX VCO. When high, this enables Tx path.
TXI	2.1Vpp	From Speech Coder IC to GIF SYN This signal is the in-phase input to the I-Q Modulator of the GIF SYN.
TXQ	2.1Vpp	From Speech Coder IC to GIF SYN This signal is the quadrature input to the I-Q Modulator of the GIF SYN.

Modem Callprocessor Interface

MDM_RD	2,8Vpp 500us/cm	From uP to SSpeech Coder. This signal indicates when the uP is reading data from the Speech Coder. High when enabled.
MDM_WR	2,8Vpp 500us/cm	From uP to Speech Coder. This signal indicates when the uP is writing data to the Speech Coder. High when enabled.

Rx SIGNALS - In Standby Mode

RX_ACQ	2,8Vpp 500us/cm	From uP to Speech Coder This is an interrupt from the uP to the Speech Coder. When high this indicates to the Speech Coder the beginning of the receive burst.
RF_START	2,8Vpp 20us/cm	From uP to GIF SYN Signal to drive the GIFSYN IC. This is a pulsed signal which controls the sending of SPI data to the GIFSYN for all RF functions.-

Rx SIGNALS - 11062#, 262000#, 25013#, 241#

Frequency 217Hz - 1ms/cm

RXI	1.8Vpp 500us/cm	From GIF Syn to Speech Coder IC. This is a baseband analogue signal to A/D convertors of Speech Coder
RXQ	1.8Vpp 500us/cm	From GIF Syn to Speech Coder IC. This is a baseband analogue signal to A/D convertors of Speech Coder
IQ_REF	1.38Vrms 500us/cm	From Speech Coder to GIF Syn. This is a DC level from Speech coder for the RXI and Q signals to ride on.

RF LAYER - ORDERABLE SPARES

Part Designator	Part Description	Part Number	Part Designator	Part Description	Part Number
CR201	Master Xtal Varactor	4809641F04	Q442	RF Switch Control	4809939C08
CR203	TX Local VCO Varactor	4809641F03	Q443	RF Switch Control	4809939C08
CR250	Main VCO Varactor	4809642F02	Shield	Can - Antenna Switch	2609225D01
CR300	TX VCO Varactor	4809641F02	Shield	Can - Main VCO	2609226D01
CR390	Transmit Diode	4809948D06	Shield	Can - Tx VCO	2609277D01
CR431	RX Local VCO Varactor	4809641F03	Shield	Can - GIFSYN	2609228D01
CR908	Signal Indicator LED	4809118D01	Shield	Can - PA	2609229D01
FL420	IF SAW Filter	9109449C01	Shield	Can - Modem	2609230D01
FL451	1st RX Filter	9109450C01	SH60 - 63	Clips	4209388S01
FL452	2nd RX Filter	9109450C01	U201	GIFSYN	5109632D92
Q202	VCO Filter	9109451C01	U300	TIC	5109632D94
Q203	RX Power Transistor	4809579E18	U301	PA / Motorola	5109908K07
Q300	Tx VCO Transistor	4813827A02	U301	PA / Alpha	5109908K27
Q303	Tx Exciter Transistor	4813827A02	U301	PA / Siemans	5109908K30
FL453	GifSyn Power Transistor	9109451C01	U310	PAC	5109632D08

TEST COMMANDS

# press 2 sec.	Enter Manual Test Mode
01 #	Exit Manual Test Mode
07 #	Mute Rx Audio Path
08 #	Unmute Rx Audio Path
09 #	Mute Tx Audio Path
10 #	Unmute Tx Audio Path
11 #	Program Main Local Osc. to Channelbb
12 #	Set Tx Power level to fixed valure
19 #	Display SW Version Number of Call Processor
20 #	Display SW Version Number of Modem
22 #	Display SW Version Number of Speech Coder
25 #	Set Continuous AGC
26xxxx #	Set Continuous AFC
31x #	Initiate Pseudo-Random Sequence with Midamble
33xxx #	Synchronize to BCH Carrier
36 #	Initiate Acoustic Loopback
37 #	Stop Test
45xxx #	Serving Cell Power Level
46 #	Display Current Valure od AFC DAC
47x #	Set Audio Volume
58 / xxxxxx #	Display / Modify Security Code
59 / xxx #	Display / Modify Lock Code
60 #	Display IMEI
7100 #	Display Error Code

FREQUENCIES

CHANNEL	Tx	Rx	MAIN VCO	Rx I.F	Rx I.F L.O	Tx I.F	Tx I.F L.O
1-Low	890.2	935.2	782.2	153	306	108	216
62-Middle	**902.4**	**947.4**	**794.4**	**153**	**306**	**108**	**216**
124-High	914.8	959.8	806.8	153	306	108	216

REVISIONS

Europe Middle East & Africa Customer Services	21.04.99
LEVEL 3 COLOUR DIAGRAMS	Rev. 1.1
GSM Dual Slot startac	
Colin Jack, Michael Hansen, Ray Collins, Ralf Lorenzen	Page 2 of 2

MOTOROLA
Europe, Middle East & Africa
Customer Services
Level 3 Authorised

SWF0246BB Bom Report

LVL	COMPONENT_PART	DESCRIPTION	QTY	C	Q	M	D	P	REF
1	SHN7129A	H&H ALEX CARDFONE BLK	1	1	1	M	Y	Y	
2	0109322D03	ASSY LENS	1	1	1	B	Y	N	
2	0185806H01	ASSY REAR ALEX BLK	1	1	1	B	Y	N	
3	0109470S01	ASSY GSM AUX FLEX	1	2	1	B	Y	N	
4	4209389S01	CLIP BOTTOM FLEX	1	2	1	B	Y	N	
4	8409390S01	PCB AUX FLEX INTERCONNECT	1	2	1	B	Y	N	
3	1585807H01	REAR HOUSING ALEX BLK	1	2	1	B	Y	N	
3	3685808H01	KNOB EJECT ALEX	1	2	1	B	Y	N	
3	4285809H01	CLIP EJECT ALEX	1	2	1	B	Y	N	
3	6109219D01	LIGHTGUIDE ALERT	1	2	1	B	Y	N	
2	0185944H01	ASSY FLIP FRNT ALEX	1	1	1	B	Y	N	
3	0104942Z01	ASSY FRNT GSM TF BLACK	1	2	1	B	Y	N	
3	0185856G01	ASSY FLIP ALEX	1	2	1	B	Y	N	
4	0109207D08	ASSY ALEX FLEX	1	2	1	B	Y	N	
5	1109210D01	ADHESIVE RTC BATTERY	1	2	1	B	Y	N	
5	1109410R01	ADHESIVE SPEAKER	1	2	1	B	Y	N	
5	3285943H01	GASKET FLEX	1	2	1	B	Y	N	
5	3909426M01	CNTCT BLK SIM CARD READER ZAP	1	2	1	B	Y	N	
5	3909492B03	CONTACT BLOCK BATT 2 CKT	1	2	1	B	Y	N	
5	5009076E01	SPKR DYN EARPC 20X50 MM	1	2	1	B	Y	N	
5	5909127D03	MOTOR VIBRATOR 0.7V 10K RPM	1	2	1	B	Y	N	
5	6009519L03	BATT LI COIN CELL	1	2	1	B	Y	N	
5	7509532K12	PAD SHOCK	1	2	1	B	Y	N	
5	8485607G01	GASKET FLEX	1	2	1	B	Y	N	
4	1509039U01	HSNG FLEX BARREL GSM BLK 259	1	2	1	B	Y	N	
4	1509222D01	HSNG SPEAKER FRNT	1	2	1	B	Y	N	
4	1585857G01	HSNG FLIP ALEX	1	2	1	B	Y	N	
4	1585858G01	HSNG SPEAKER REAR ALEX	1	2	1	B	Y	N	

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          4    1585859G01   HSNG SIM SPACER ALEX              1 2 1 B
Y N
          4    3209208D01   GASKET SPEAKER                    1 2 1 B
Y N
          4    3509120R01   FELT REAR SPKR                    1 2 1 B
Y N
          4    5983583N18   MAGNET GSM RAE                    1 2 1 B
Y N
          3   3309284K01    NMPLT METAL                       1 2 1 B
Y N
          3   4709050R01    SHAFT GSM RIGHT                   1 2 1 B
Y N
          3   5509242E04    HINGE LUBE SPEC                   1 2 1 B
Y N
          2  5402419T02     LABEL CIT WHITE                   1 1 1 B
Y N
          1 SHN7131A        HSN & HDW ALEX COM BLK            1 1 1 M
Y Y
          2  0309315B07     SCREW TORX PLUS W/AUTOSER 1.8     2 1 1 B
Y N
          2  0509220D01     GROMMET MIC                       1 1 1 B
Y N
          2  0509270M01     GROMMET ALERT                     1 1 1 B
Y N
          2  1109155J01     ADHESIVE DCA COVER                1 1 1 B
Y N
          2  2609231D01     SHIELD LOGIC                      1 1 1 B
Y N
          2  5009536H15     MIC LEADED W/PINS                 1 1 1 B
Y N
          2  5102543T01     TEMP MIC 5009536H15 PANASONIC     1 4 1 B
Y N
          2  7509165R01     PAD SHOCK                         1 1 1 B
Y N
          2  7509190M01     KEYPAD SHOCK                      1 1 1 B
Y N
          2  8585604J01     ANT ASSY STUBBY GSM               1 1 1 B
Y N
          1 SHN7193A        KEYPAD ALEX UNIQ BARCLAYCARD      1 1 1 M
Y Y
          2  3809105S07     KEYPAD BARCLAYCARD                1 1 1 B
Y N
          1 SLF2079B        BDSET STARTC D SIEM               1 1 1 M
Y Y
          2  SLF7710B       XCVR BD STARTC D SIEM             1 1 1 M
Y N
          3   0109043A18    STARTAC D TOP SIEM                1 1 1 M
Y Y
          4    0609118R01   VARISTOR CHIP 0805 SMD            2 1 1 B
Y N RV0607
          4                 VARISTOR CHIP 0805 SMD              1 1 B
Y N RV0608
          4    0609591M39   RES CHIP DUAL 15K 5% 0.63W        4 1 1 B
Y N R00702
          4                 RES CHIP DUAL 15K 5% 0.63W          1 1 B
Y N R00703
          4                 RES CHIP DUAL 15K 5% 0.63W          1 1 B
Y N R00705
          4                 RES CHIP DUAL 15K 5% 0.63W          1 1 B
Y N R00708
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         4    0609591M45   RES CHIP DUAL 47K 5% 0.63W        6 1 1 B
Y N R01100
         4                 RES CHIP DUAL 47K 5% 0.63W          1 1 B
Y N R00726
         4                 RES CHIP DUAL 47K 5% 0.63W          1 1 B
Y N R00727
                           Motorola Internal Use Only

                              SWF0246BB Bom Report
       LVL COMPONENT_PART  DESCRIPTION                      QTY C Q M
D P REF
---------- --------------- ------------------------------ ---- - - -
- - ------
         4    0609591M45   RES CHIP DUAL 47K 5% 0.63W        6 1 1 B
Y N R00728
         4                 RES CHIP DUAL 47K 5% 0.63W          1 1 B
Y N R00729
         4                 RES CHIP DUAL 47K 5% 0.63W          1 1 B
Y N R00734
         4    0660076N01   RES CHIP 10 5 1/16 0603           2 1 1 B
Y N R00852
         4                 RES CHIP 10 5 1/16 0603             1 1 B
Y N R00853
         4    0662057M01   RES. CHIP 0    5% 20X40           5 1 1 B
Y N C00823
         4                 RES. CHIP 0    5% 20X40             1 1 B
Y N R01115
         4                 RES. CHIP 0    5% 20X40             1 1 B
Y N R00778
         4                 RES. CHIP 0    5% 20X40             1 1 B
Y N R00834
         4                 RES. CHIP 0    5% 20X40             1 1 B
Y N R00879
         4    0662057M26   RES. CHIP 10   5% 20X40           4 1 1 B
Y N R01103
         4                 RES. CHIP 10   5% 20X40             1 1 B
Y N R00828
         4                 RES. CHIP 10   5% 20X40             1 1 B
Y N R00850
         4                 RES. CHIP 10   5% 20X40             1 1 B
Y N R00851
         4    0662057M50   RES. CHIP 100  5% 20X40           6 1 1 B
Y N R00714
         4                 RES. CHIP 100  5% 20X40             1 1 B
Y N R00719
         4                 RES. CHIP 100  5% 20X40             1 1 B
Y N R00724
         4                 RES. CHIP 100  5% 20X40             1 1 B
Y N R00730
         4                 RES. CHIP 100  5% 20X40             1 1 B
Y N R00799
         4                 RES. CHIP 100  5% 20X40             1 1 B
Y N R00909
         4    0662057M58   RES. CHIP 220  5% 20X40           1 1 1 B
Y N R00721
         4    0662057M61   RES CHIP 300 5% 20X40             1 1 1 B
Y N R00908
         4    0662057M68   RES. CHIP 560  5% 20X40           3 1 1 B
Y N R00806
         4                 RES. CHIP 560  5% 20X40             1 1 B
Y N R00807
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         4                RES. CHIP 560  5% 20X40            1 1 B
Y N R00809
         4    0662057M74  RES. CHIP 1000  5% 20X40          8 1 1 B
Y N R00716
         4                RES. CHIP 1000  5% 20X40            1 1 B
Y N R00718
         4                RES. CHIP 1000  5% 20X40            1 1 B
Y N R00723
         4                RES. CHIP 1000  5% 20X40            1 1 B
Y N R00741
         4                RES. CHIP 1000  5% 20X40            1 1 B
Y N R00796
         4                RES. CHIP 1000  5% 20X40            1 1 B
Y N R00847
         4                RES. CHIP 1000  5% 20X40            1 1 B
Y N R00920
         4                RES. CHIP 1000  5% 20X40            1 1 B
Y N R01229
         4    0662057M78  RES. CHIP 1500  5% 20X40          1 1 1 B
Y N R00717
         4    0662057M80  RES. CHIP 1800  5% 20X40          1 1 1 B
Y N R00110
         4    0662057M81  RES. CHIP 2000  5% 20X40          1 1 1 B
Y N R00439
         4    0662057M90  RES. CHIP 4700  5% 20X40          7 1 1 B
Y N R01106
         4                RES. CHIP 4700  5% 20X40            1 1 B
Y N R00650
         4                RES. CHIP 4700  5% 20X40            1 1 B
Y N R00797
         4                RES. CHIP 4700  5% 20X40            1 1 B
Y N R00808
         4                RES. CHIP 4700  5% 20X40            1 1 B
Y N R00845
         4                RES. CHIP 4700  5% 20X40            1 1 B
Y N R00901
         4                RES. CHIP 4700  5% 20X40            1 1 B
Y N R00902
         4    0662057M92  RES. CHIP 5600  5% 20X40          2 1 1 B
Y N R01027
         4                RES. CHIP 5600  5% 20X40            1 1 B
Y N R00725
         4    0662057M98  RES. CHIP 10K   5% 20X40         13 1 1 B
Y N R01011
         4                RES. CHIP 10K   5% 20X40            1 1 B
Y N R01013
         4                RES. CHIP 10K   5% 20X40            1 1 B
Y N R00609
         4                RES. CHIP 10K   5% 20X40            1 1 B
Y N R00611
         4                RES. CHIP 10K   5% 20X40            1 1 B
Y N R00613
         4                RES. CHIP 10K   5% 20X40            1 1 B
Y N R00614
         4                RES. CHIP 10K   5% 20X40            1 1 B
Y N R00722
         4                RES. CHIP 10K   5% 20X40            1 1 B
Y N R00740
         4                RES. CHIP 10K   5% 20X40            1 1 B
Y N R00782
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         4                 RES. CHIP 10K   5% 20X40            1 1 B
Y N R00836
         4                 RES. CHIP 10K   5% 20X40            1 1 B
Y N R00846
         4                 RES. CHIP 10K   5% 20X40            1 1 B
Y N R00910
         4                 RES. CHIP 10K   5% 20X40            1 1 B
Y N R01227
         4    0662057N03   RES. CHIP 15K   5% 20X40         17 1 1 B
Y N R00701
         4                 RES. CHIP 15K   5% 20X40            1 1 B
Y N R00706
         4                 RES. CHIP 15K   5% 20X40            1 1 B
Y N R00710
                           Motorola Internal Use Only

                              SWF0246BB Bom Report
       LVL COMPONENT_PART  DESCRIPTION                    QTY C Q M
D P REF
---------- --------------- ------------------------------ ---- - - -
- - ------
         4    0662057N03   RES. CHIP 15K   5% 20X40         17 1 1 B
Y N R00711
         4                 RES. CHIP 15K   5% 20X40            1 1 B
Y N R00712
         4                 RES. CHIP 15K   5% 20X40            1 1 B
Y N R00713
         4                 RES. CHIP 15K   5% 20X40            1 1 B
Y N R00715
         4                 RES. CHIP 15K   5% 20X40            1 1 B
Y N R00736
         4                 RES. CHIP 15K   5% 20X40            1 1 B
Y N R00737
         4                 RES. CHIP 15K   5% 20X40            1 1 B
Y N R00742
         4                 RES. CHIP 15K   5% 20X40            1 1 B
Y N R00743
         4                 RES. CHIP 15K   5% 20X40            1 1 B
Y N R00750
         4                 RES. CHIP 15K   5% 20X40            1 1 B
Y N R00815
         4                 RES. CHIP 15K   5% 20X40            1 1 B
Y N R00816
         4                 RES. CHIP 15K   5% 20X40            1 1 B
Y N R00837
         4                 RES. CHIP 15K   5% 20X40            1 1 B
Y N R00842
         4                 RES. CHIP 15K   5% 20X40            1 1 B
Y N R00843
         4    0662057N05   RES. CHIP 18K   5% 20X40          4 1 1 B
Y N R00801
         4                 RES. CHIP 18K   5% 20X40            1 1 B
Y N R00802
         4                 RES. CHIP 18K   5% 20X40            1 1 B
Y N R00803
         4                 RES. CHIP 18K   5% 20X40            1 1 B
Y N R00810
         4    0662057N06   RES. CHIP 20K   5% 20X40          2 1 1 B
Y N R00907
         4                 RES. CHIP 20K   5% 20X40            1 1 B
Y N R00989
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         4    0662057N07   RES. CHIP 22K   5% 20X40          1 1 1 B
Y N R00720
         4    0662057N09   RES. CHIP 27K   5% 20X40          3 1 1 B
Y N R00800
         4                 RES. CHIP 27K   5% 20X40            1 1 B
Y N R00838
         4                 RES. CHIP 27K   5% 20X40            1 1 B
Y N R1222
         4    0662057N10   RES. CHIP 30K   5% 20X40          1 1 1 B
Y N R1226
         4    0662057N13   RES. CHIP 39K   5% 20X40          1 1 1 B
Y N R00805
         4    0662057N15   RES. CHIP 47K   5% 20X40         10 1 1 B
Y N R00761
         4                 RES. CHIP 47K   5% 20X40            1 1 B
Y N R00763
         4                 RES. CHIP 47K   5% 20X40            1 1 B
Y N R00791
         4                 RES. CHIP 47K   5% 20X40            1 1 B
Y N R00804
         4                 RES. CHIP 47K   5% 20X40            1 1 B
Y N R00812
         4                 RES. CHIP 47K   5% 20X40            1 1 B
Y N R00813
         4                 RES. CHIP 47K   5% 20X40            1 1 B
Y N R00824
         4                 RES. CHIP 47K   5% 20X40            1 1 B
Y N R00877
         4                 RES. CHIP 47K   5% 20X40            1 1 B
Y N R00878
         4                 RES. CHIP 47K   5% 20X40            1 1 B
Y N R01228
         4    0662057N19   RES. CHIP 68K   5% 20X40          1 1 1 B
Y N R00825
         4    0662057N23   RES. CHIP 100K  5% 20X40         10 1 1 B
Y N R01010
         4                 RES. CHIP 100K  5% 20X40            1 1 B
Y N R01014
         4                 RES. CHIP 100K  5% 20X40            1 1 B
Y N R00104
         4                 RES. CHIP 100K  5% 20X40            1 1 B
Y N R00704
         4                 RES. CHIP 100K  5% 20X40            1 1 B
Y N R00747
         4                 RES. CHIP 100K  5% 20X40            1 1 B
Y N R00748
         4                 RES. CHIP 100K  5% 20X40            1 1 B
Y N R00749
         4                 RES. CHIP 100K  5% 20X40            1 1 B
Y N R00752
         4                 RES. CHIP 100K  5% 20X40            1 1 B
Y N R1224
         4                 RES. CHIP 100K  5% 20X40            1 1 B
Y N R01230
         4    0662057N29   RES. CHIP 180K  5% 20X40          2 1 1 B
Y N R01019
         4                 RES. CHIP 180K  5% 20X40            1 1 B
Y N R00612
         4    0662057N33   RES. CHIP 270K  5% 20X40          2 1 1 B
Y N R01107
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4		RES. CHIP 270K 5% 20X40		1	1	B	Y	N	R00911
4	0662057N39	RES CHIP 470K 5% 20X40	6	1	1	B	Y	N	R00103
4		RES CHIP 470K 5% 20X40		1	1	B	Y	N	R00615
4		RES CHIP 470K 5% 20X40		1	1	B	Y	N	R00617
4		RES CHIP 470K 5% 20X40		1	1	B	Y	N	R00912
4		RES CHIP 470K 5% 20X40		1	1	B	Y	N	R1223
4		RES CHIP 470K 5% 20X40		1	1	B	Y	N	R1225
4	0680195M64	RES 0.24 OHM 1/2W	1	1	1	B	Y	N	R00602
4	0909449B04	RECEPT MOD 15PIN INSMLD	1	1	1	B	Y	N	J00600
4	2113740F35	CAP CHIP REEL CL1 +/-30 22.0	1	1	1	B	Y	N	C00703
4	2113741F25	CAP CHIP CL2 X7R REEL 1000	1	1	1	B	Y	N	C00815

LVL	COMPONENT_PART	DESCRIPTION	QTY	C	Q	M	D	P	REF
4	2113741F49	CAP CHIP CL2 X7R REEL .01UF	3	1	1	B	Y	N	C01021
4		CAP CHIP CL2 X7R REEL .01UF		1	1	B	Y	N	C00912
4		CAP CHIP CL2 X7R REEL .01UF		1	1	B	Y	N	C00960
4	2113743A27	CAP CHIP .470 UF 10% 16V	2	1	1	B	Y	N	C00810
4		CAP CHIP .470 UF 10% 16V		1	1	B	Y	N	C00828
4	2113743E07	CER CHIP CAP .022UF	1	1	1	B	Y	N	C00804
4	2113743E12	CAP CHIP .047 UF 10% X7R	12	1	1	B	Y	N	C00704
4		CAP CHIP .047 UF 10% X7R		1	1	B	Y	N	C00705
4		CAP CHIP .047 UF 10% X7R		1	1	B	Y	N	C00711
4		CAP CHIP .047 UF 10% X7R		1	1	B	Y	N	C00751
4		CAP CHIP .047 UF 10% X7R		1	1	B	Y	N	C00753
4		CAP CHIP .047 UF 10% X7R		1	1	B	Y	N	C00754
4		CAP CHIP .047 UF 10% X7R		1	1	B	Y	N	C00755
4		CAP CHIP .047 UF 10% X7R		1	1	B	Y	N	C00757
4		CAP CHIP .047 UF 10% X7R		1	1	B	Y	N	C00759
4		CAP CHIP .047 UF 10% X7R		1	1	B	Y	N	C00760

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         4                CAP CHIP .047 UF 10% X7R            1 1 B
Y N C00761
         4                CAP CHIP .047 UF 10% X7R            1 1 B
Y N C00826
         4    2113743E20  CAP CHIP .10 UF 10%              18 1 1 B
Y N C00803
         4                CAP CHIP .10 UF 10%                 1 1 B
Y N C00816
         4                CAP CHIP .10 UF 10%                 1 1 B
Y N C00825
         4                CAP CHIP .10 UF 10%                 1 1 B
Y N C00829
         4                CAP CHIP .10 UF 10%                 1 1 B
Y N C00830
         4                CAP CHIP .10 UF 10%                 1 1 B
Y N C00832
         4                CAP CHIP .10 UF 10%                 1 1 B
Y N C00851
         4                CAP CHIP .10 UF 10%                 1 1 B
Y N C00852
         4                CAP CHIP .10 UF 10%                 1 1 B
Y N C00853
         4                CAP CHIP .10 UF 10%                 1 1 B
Y N C00855
         4                CAP CHIP .10 UF 10%                 1 1 B
Y N C00856
         4                CAP CHIP .10 UF 10%                 1 1 B
Y N C00857
         4                CAP CHIP .10 UF 10%                 1 1 B
Y N C00877
         4                CAP CHIP .10 UF 10%                 1 1 B
Y N C00878
         4                CAP CHIP .10 UF 10%                 1 1 B
Y N C00909
         4                CAP CHIP .10 UF 10%                 1 1 B
Y N C01026
         4                CAP CHIP .10 UF 10%                 1 1 B
Y N C01027
         4                CAP CHIP .10 UF 10%                 1 1 B
Y N C00899
         4    2113743H14  CAP CHIP 10.0 UF 16V +80-20%        3 1 1 B
Y N C00902
         4                CAP CHIP 10.0 UF 16V +80-20%        1 1 B
Y N C00903
         4                CAP CHIP 10.0 UF 16V +80-20%        1 1 B
Y N C00908
         4    2113743L05  CAP CHIP 330 PF 10% X7R             2 1 1 B
Y N C01002
         4                CAP CHIP 330 PF 10% X7R             1 1 B
Y N C00827
         4    2113743L17  CAP CHIP 1000 PF 10% X7R            2 1 1 B
Y N C00443
         4                CAP CHIP 1000 PF 10% X7R            1 1 B
Y N C00967
         4    2113743L21  CAP CHIP 1500 PF 10% X7R            2 1 1 B
Y N C00620
         4                CAP CHIP 1500 PF 10% X7R            1 1 B
Y N C00845
         4    2113743L41  CAP CHIP 10000 PF 10% X7R           1 1 1 B
Y N C00762
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         4    2113743M08   CAP CHIP 22000 PF +80-20% Y5V     2 1 1 B
Y N C00709
         4                 CAP CHIP 22000 PF +80-20% Y5V       1 1 B
Y N C00712
         4    2113743M24   CAP CHIP 100000 PF +80-20% Y5V    3 1 1 B
Y N C00824
         4                 CAP CHIP 100000 PF +80-20% Y5V      1 1 B
Y N C00922
         4                 CAP CHIP 100000 PF +80-20% Y5V      1 1 B
Y N C00933
         4    2113743N12   CAP CHIP 2.7 PF +-.25PF COG       2 1 1 B
Y N C00791
         4                 CAP CHIP 2.7 PF +-.25PF COG         1 1 B
Y N C00918
         4    2113743N14   CAP CHIP 3.3 PF +-.25PF COG       1 1 1 B
Y N C00792
         4    2113743N26   CAP CHIP 10.0 PF 5% COG           2 1 1 B
Y N C00701
         4                 CAP CHIP 10.0 PF 5% COG             1 1 B
Y N C00904
         4    2113743N34   CAP CHIP 22.0 PF 5% COG           1 1 1 B
Y N C00600
         4    2113743N36   CAP CHIP 27.0 PF 5% COG           2 1 1 B
Y N C00455
         4                 CAP CHIP 27.0 PF 5% COG             1 1 B
Y N C00966
         4    2113743N38   CAP CHIP 33.0 PF 5% COG          23 1 1 B
Y N C00601
         4                 CAP CHIP 33.0 PF 5% COG             1 1 B
Y N C00603
                           Motorola Internal Use Only

                              SWF0246BB Bom Report
       LVL COMPONENT_PART  DESCRIPTION                      QTY C Q M
D P REF
---------- --------------- ------------------------------ ---- - - -
- - ------
         4    2113743N38   CAP CHIP 33.0 PF 5% COG          23 1 1 B
Y N C00604
         4                 CAP CHIP 33.0 PF 5% COG             1 1 B
Y N C00610
         4                 CAP CHIP 33.0 PF 5% COG             1 1 B
Y N C00611
         4                 CAP CHIP 33.0 PF 5% COG             1 1 B
Y N C00612
         4                 CAP CHIP 33.0 PF 5% COG             1 1 B
Y N C00613
         4                 CAP CHIP 33.0 PF 5% COG             1 1 B
Y N C00614
         4                 CAP CHIP 33.0 PF 5% COG             1 1 B
Y N C00801
         4                 CAP CHIP 33.0 PF 5% COG             1 1 B
Y N C00802
         4                 CAP CHIP 33.0 PF 5% COG             1 1 B
Y N C00806
         4                 CAP CHIP 33.0 PF 5% COG             1 1 B
Y N C00808
         4                 CAP CHIP 33.0 PF 5% COG             1 1 B
Y N C00809
         4                 CAP CHIP 33.0 PF 5% COG             1 1 B
Y N C00811
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         4                CAP CHIP 33.0 PF 5% COG             1 1 B
Y N C00814
         4                CAP CHIP 33.0 PF 5% COG             1 1 B
Y N C00833
         4                CAP CHIP 33.0 PF 5% COG             1 1 B
Y N C00858
         4                CAP CHIP 33.0 PF 5% COG             1 1 B
Y N C00859
         4                CAP CHIP 33.0 PF 5% COG             1 1 B
Y N C00861
         4                CAP CHIP 33.0 PF 5% COG             1 1 B
Y N C00862
         4                CAP CHIP 33.0 PF 5% COG             1 1 B
Y N C00863
         4                CAP CHIP 33.0 PF 5% COG             1 1 B
Y N C00889
         4                CAP CHIP 33.0 PF 5% COG             1 1 B
Y N C00916
         4    2113743N50  CAP CHIP 100 PF 5% COG           1 1 1 B
Y N C00440
         4    2113743N54  CAP CHIP 150 PF 5% COG           1 1 1 B
Y N C00710
         4    2113928A01  CAP CER CHIP 1.0 UF 10V          1 1 1 B
Y N C1025
         4    2113928J08  CAP CERAMIC CHIP 10.0UF          5 1 1 B
Y N C00907
         4                CAP CERAMIC CHIP 10.0UF             1 1 B
Y N C00910
         4                CAP CERAMIC CHIP 10.0UF             1 1 B
Y N C00913
         4                CAP CERAMIC CHIP 10.0UF             1 1 B
Y N C00914
         4                CAP CERAMIC CHIP 10.0UF             1 1 B
Y N C00924
         4    2309109S01  CAP TANT CHIP 4.7UF 20% 10V      1 1 1 B
Y N C00817
         4    2309121D19  CAP CHIP TANT 10 UF 10% 10 V     2 1 1 B
Y N C00901
         4                CAP CHIP TANT 10 UF 10% 10 V        1 1 B
Y N C00906
         4    2309121D23  CAP CHIP TANT 68 UF 10% 10 V     1 1 1 B
Y N C00915
         4    2311049A54  CAP TAN CHIP A/P 3.3 20 16       3 1 1 B
Y N C00102
         4                CAP TAN CHIP A/P 3.3 20 16          1 1 B
Y N C00103
         4                CAP TAN CHIP A/P 3.3 20 16          1 1 B
Y N C00104
         4    2311049A56  CAP TAN CHIP A/P 4.7 20 10       2 1 1 B
Y N C00812
         4                CAP TAN CHIP A/P 4.7 20 10          1 1 B
Y N C00831
         4    2409646M13  IND CER MULTILYR 39NH 1608       1 1 1 B
Y N L00442
         4    2509306J01  CHOKE 15 UH SMD                  1 1 1 B
Y N T00902
         4    2509306J02  CHOKE 15UH 6.5X4.2MM SMD         1 4 1 B
Y N T00902
         4    2609827G03  SHIELD SPACER                    1 1 1 B
Y N SH0050
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         4    2809454C02   PLUG LO PROFILE SMD 32 POS        1 1 1 B
Y N J00101
         4    4009060E01   SW TACTILE SMD                    3 1 1 B
Y N S00001
         4                 SW TACTILE SMD                      1 1 B
Y N S00002
         4                 SW TACTILE SMD                      1 1 B
Y N S00003
         4    4204774Z01   CLIP LOGIC SHIELD #1              3 1 1 B
Y N SH0025
         4                 CLIP LOGIC SHIELD #1                1 1 B
Y N SH0026
         4                 CLIP LOGIC SHIELD #1                1 1 B
Y N SH0027
         4    4209190E01   CLIP LOGIC SHIELD #2              3 1 1 B
Y N SH0011
         4                 CLIP LOGIC SHIELD #2                1 1 B
Y N SH0012
         4                 CLIP LOGIC SHIELD #2                1 1 B
Y N SH0013
         4    4209233D01   CLIP ANTENNA TUBE                 1 1 1 B
Y N A00001
         4    4809579E09   TSTR MOSFET P-CHAN 2SJ346         1 1 1 B
Y N Q00102
         4    4809579E11   TSTR MOSFET P-CHAN NDS0601        1 1 1 B
Y N Q00922
         4    4809579E16   TSTR MOSFET N-CHAN TN0200T        1 1 1 B
Y N Q01012
         4    4809579E17   TSTR MOSFET P-CHAN SI9424         1 1 1 B
Y N Q00601
         4    4809579E18   TSTR MOSFET P-CHAN TP0101T        1 1 1 B
Y N Q01011
         4    4809605E02   TSTR SIG NPN 2SC4617              3 1 1 B
Y N Q00110
         4                 TSTR SIG NPN 2SC4617                1 1 B
Y N Q00606
         4                 TSTR SIG NPN 2SC4617                1 1 B
Y N Q1015
                           Motorola Internal Use Only

                              SWF0246BB Bom Report
       LVL COMPONENT_PART  DESCRIPTION                     QTY C Q M
D P REF
---------- --------------- ------------------------------ ---- - - -
- - ------
         4    4809606E02   DIODE DUAL ARRAY DAN222           2 1 1 B
Y N CR1000
         4                 DIODE DUAL ARRAY DAN222             1 1 B
Y N CR0902
         4    4809606E03   DIODE DUAL ARRAY DAP222           4 1 1 B
Y N CR0702
         4                 DIODE DUAL ARRAY DAP222             1 1 B
Y N CR0703
         4                 DIODE DUAL ARRAY DAP222             1 1 B
Y N CR0704
         4                 DIODE DUAL ARRAY DAP222             1 1 B
Y N CR0719
         4    4809606E07   DIODE DUAL ARRAY DA221            4 1 1 B
Y N CR0710
         4                 DIODE DUAL ARRAY DA221              1 1 B
Y N CR0711
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         4                DIODE DUAL ARRAY DA221              1 1 B
Y N CR0712
         4                DIODE DUAL ARRAY DA221              1 1 B
Y N CR0718
         4    4809606E08  DIODE DUAL SCHOTTKEY RB715F       1 1 1 B
Y N CR0608
         4    4809607E02  TSTR SIG PNP 25A1774              2 1 1 B
Y N Q00903
         4                TSTR SIG PNP 25A1774                1 1 B
Y N Q00904
         4    4809608E03  TSTR DIG PNP DTA114YE             2 1 1 B
Y N Q00803
         4                TSTR DIG PNP DTA114YE               1 1 B
Y N Q01017
         4    4809653F02  RECT SCHOTTKY 1.0A UPS5817         2 1 1 B
Y N CR0910
         4                RECT SCHOTTKY 1.0A UPS5817          1 1 B
Y N CR0920
         4    4809653F03  DIODE SCHOTTKY 1A 10BQ040 SMD     2 1 1 B
Y N CR0605
         4                DIODE SCHOTTKY 1A 10BQ040 SMD       1 1 B
Y N CR0903
         4    4809788E06  DIODE ZENER 6.8V UDZ6.8B          6 1 1 B
Y N CR0904
         4                DIODE ZENER 6.8V UDZ6.8B            1 1 B
Y N CR0999
         4                DIODE ZENER 6.8V UDZ6.8B            1 1 B
Y N VR0604
         4                DIODE ZENER 6.8V UDZ6.8B            1 1 B
Y N VR0605
         4                DIODE ZENER 6.8V UDZ6.8B            1 1 B
Y N VR0606
         4                DIODE ZENER 6.8V UDZ6.8B            1 1 B
Y N VR0609
         4    4809788E08  DIODE ZENER 8.2V UDZTE178.2B      2 1 1 B
Y N VR0901
         4                DIODE ZENER 8.2V UDZTE178.2B        1 1 B
Y N VR0902
         4    4809939C04  TSTR DUAL PNP/NPN UMC3            2 1 1 B
Y N Q01001
         4                TSTR DUAL PNP/NPN UMC3              1 1 B
Y N Q00602
         4    4809939C05  TSTR DUAL NPN/PNP UMH 5           1 1 1 B
Y N Q01010
         4    4809940E02  TSTR DIG NPN DTC114YE             2 1 1 B
Y N Q00801
         4                TSTR DIG NPN DTC114YE               1 1 B
Y N Q01016
         4    4809940E03  TSTR DIG NPN DTC114TE             1 1 1 B
Y N Q00613
         4    4809995L05  XTAL QUARTZ 32.768KHZ CC4V-T1     1 1 1 B
Y N Y00701
         4    4813823A07  XSTR N-CH TMOS FET 2N7002LT1      1 1 1 B
Y N Q00104
         4    4813824M33  TSTR PNP 60V .6A GEN PURP         1 1 1 B
Y N Q00703
         4    5009473S03  ALERT EM 5V 8.5MM SMD             1 1 1 B
Y N AL0800
         4    5109512F02  IC VOLT REG 2.7V LP2981 5SOT      1 1 1 B
Y N U00918
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         4    5109522E10   IC 3-INV LMOS TC7W04FU           1 1 1 B
Y N U00804
         4    5109522E13   IC BILAT SW TC7S66FU             4 1 1 B
Y N Q00607
         4                 IC BILAT SW TC7S66FU               1 1 B
Y N Q00608
         4                 IC BILAT SW TC7S66FU               1 1 B
Y N Q00609
         4                 IC BILAT SW TC7S66FU               1 1 B
Y N Q00610
         4    5109522E15   IC SNGL INV TC7S04FU             1 1 1 B
Y N U914
         4    5109522E22   IC SNGL AND GATE TC7S08FU        1 1 1 B
Y N U00917
         4    5109632D44   IC CUST DIG POT/ATTN DS1866      1 1 1 B
Y N U00802
         4    5109632D69   IC CUST BICMOS GCAP 48QFP        1 1 1 B
Y N U00900
         4    5109688L09   IC SRAM 64KX16 M5M51016BVP       1 1 1 B
Y N U00704
         4    5109781E50   IC LIN 5V REG LM2980 SOT23       2 1 1 B
Y N U00902
         4                 IC LIN 5V REG LM2980 SOT23         1 1 B
Y N U915
         4    5109781E77   IC VOLT DECT 3.6V PST995NNR      1 1 1 B
Y N U00910
         4    5109817F22   IC COMPTR LMC7221 SOT23          1 1 1 B
Y N U916
         4    5109841C30   IC MCU SCSF416776                1 1 1 B
Y N U00701
         4    5109841C38   IC MCU 68338 DCA E3                1 1 B
Y N
         4    5109920D12   IC DC-DC CONV INVDBLR 682EOA     1 1 1 B
Y N U00101
         4    5109920D19   IC PCM CODEC 145484SD 20SSOP     1 1 1 B
Y N U00803
         4    5109962C11   IC ASIC BIC 4.2 SCS38138EC11     1 1 1 B
Y N U00703
         4    5199245A01   IC FLASH PROM 512KX16 28F800-B   1 1 1 B
Y N U00702
         4    5199295A01   IC ROM 64 BIT DS2401 FLIP CHIP   1 1 1 B
Y N U00706
         4    5199301A01   IC EEPROM SPCL 8KX8 28BV64       1 1 1 B
Y N U00705
         4    5199305A01   IC DSP 1627T36PCH                1 1 1 B
Y N U00801
                           Motorola Internal Use Only

                              SWF0246BB Bom Report
       LVL COMPONENT_PART  DESCRIPTION                     QTY C Q M
D P REF
---------- --------------- ------------------------------ ---- - - -
- - ------
         3   0109043A19    STARTAC D BOT SIEM               1 1 1 M
Y Y
         4    0609591M37   RES CHIP DUAL 10K 5% 0.63W       2 1 1 B
Y N R00440
         4                 RES CHIP DUAL 10K 5% 0.63W         1 1 B
Y N R00441
         4    0611079A01   RES FIXED CHIP 0 5 1/10W A/P     1 1 1 B
Y N CR0432
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         4    0660076N57   RES CHIP 2200 OHM 1/16 W          1 1 1 B
Y N R00435
         4    0662057M01   RES. CHIP 0    5% 20X40           1 1 1 B
Y N R00507
         4    0662057M26   RES. CHIP 10   5% 20X40           3 1 1 B
Y N R01105
         4                 RES. CHIP 10   5% 20X40             1 1 B
Y N R01219
         4                 RES. CHIP 10   5% 20X40             1 1 B
Y N R00398
         4    0662057M30   RES. CHIP 15 5% 20X40             2 1 1 B
Y N R00262
         4                 RES. CHIP 15 5% 20X40             1 1 B
Y N R00432
         4    0662057M32   RES. CHIP 18   5% 20X40           1 1 1 B
Y N R00393
         4    0662057M34   RES. CHIP 22   5% 20X40           1 1 1 B
Y N R00258
         4    0662057M36   RES. CHIP 27   5% 20X40           2 1 1 B
Y N R00210
         4                 RES. CHIP 27   5% 20X40             1 1 B
Y N R00302
         4    0662057M38   RES CHIP 33 5% 20X40             3 1 1 B
Y N R00203
         4                 RES CHIP 33 5% 20X40             1 1 B
Y N R00228
         4                 RES CHIP 33 5% 20X40             1 1 B
Y N R00229
         4    0662057M43   RES. CHIP 51   5% 20X40           4 1 1 B
Y N L00301
         4                 RES. CHIP 51   5% 20X40             1 1 B
Y N R00257
         4                 RES. CHIP 51   5% 20X40             1 1 B
Y N R00263
         4                 RES. CHIP 51   5% 20X40             1 1 B
Y N R00350
         4    0662057M50   RES. CHIP 100  5% 20X40          10 1 1 B
Y N R00206
         4                 RES. CHIP 100  5% 20X40             1 1 B
Y N R00259
         4                 RES. CHIP 100  5% 20X40             1 1 B
Y N R00304
         4                 RES. CHIP 100  5% 20X40             1 1 B
Y N R00358
         4                 RES. CHIP 100  5% 20X40             1 1 B
Y N R00415
         4                 RES. CHIP 100  5% 20X40             1 1 B
Y N R00424
         4                 RES. CHIP 100  5% 20X40             1 1 B
Y N R00436
         4                 RES. CHIP 100  5% 20X40             1 1 B
Y N R01111
         4                 RES. CHIP 100  5% 20X40             1 1 B
Y N R744
         4                 RES. CHIP 100  5% 20X40             1 1 B
Y N R00738
         4    0662057M54   RES. CHIP 150  5% 20X40           2 1 1 B
Y N R00221
         4                 RES. CHIP 150  5% 20X40             1 1 B
Y N R00264
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         4    0662057M58   RES. CHIP 220  5% 20X40           5 1 1 B
Y N R00255
         4                 RES. CHIP 220  5% 20X40             1 1 B
Y N R00300
         4                 RES. CHIP 220  5% 20X40             1 1 B
Y N R00305
         4                 RES. CHIP 220  5% 20X40             1 1 B
Y N R00394
         4                 RES. CHIP 220  5% 20X40             1 1 B
Y N R00395
         4    0662057M60   RES. CHIP 270  5% 20X40           3 1 1 B
Y N R00250
         4                 RES. CHIP 270  5% 20X40             1 1 B
Y N R00423
         4                 RES. CHIP 270  5% 20X40             1 1 B
Y N R00501
         4    0662057M62   RES. CHIP 330  5% 20X40           1 1 1 B
Y N R00328
         4    0662057M68   RES. CHIP 560  5% 20X40           1 1 1 B
Y N R00303
         4    0662057M70   RES. CHIP 680  5% 20X40           2 1 1 B
Y N R00390
         4                 RES. CHIP 680  5% 20X40             1 1 B
Y N R00426
         4    0662057M74   RES. CHIP 1000  5% 20X40          7 1 1 B
Y N R00253
         4                 RES. CHIP 1000  5% 20X40            1 1 B
Y N R00327
         4                 RES. CHIP 1000  5% 20X40            1 1 B
Y N R00331
         4                 RES. CHIP 1000  5% 20X40            1 1 B
Y N R00380
         4                 RES. CHIP 1000  5% 20X40            1 1 B
Y N R00502
         4                 RES. CHIP 1000  5% 20X40            1 1 B
Y N R00508
         4                 RES. CHIP 1000  5% 20X40            1 1 B
Y N R00514
         4    0662057M76   RES. CHIP 1200  5% 20X40          1 1 1 B
Y N R00422
         4    0662057M78   RES. CHIP 1500  5% 20X40          1 1 1 B
Y N R00251
         4    0662057M80   RES. CHIP 1800  5% 20X40          3 1 1 B
Y N R00225
         4                 RES. CHIP 1800  5% 20X40            1 1 B
Y N R00252
         4                 RES. CHIP 1800  5% 20X40            1 1 B
Y N R00330
         4    0662057M82   RES. CHIP 2200  5% 20X40          3 1 1 B
Y N R00260
         4                 RES. CHIP 2200  5% 20X40            1 1 B
Y N R00421
         4                 RES. CHIP 2200  5% 20X40            1 1 B
Y N R00446
                           Motorola Internal Use Only

                              SWF0246BB Bom Report
       LVL COMPONENT_PART  DESCRIPTION                    QTY C Q M
D P REF
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- - ------
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         4    0662057M84   RES. CHIP 2700  5% 20X40          1 1 1 B
Y N R00204
         4    0662057M86   RES. CHIP 3300  5% 20X40          1 1 1 B
Y N R00261
         4    0662057M90   RES. CHIP 4700  5% 20X40          5 1 1 B
Y N R01015
         4                 RES. CHIP 4700  5% 20X40            1 1 B
Y N R00301
         4                 RES. CHIP 4700  5% 20X40            1 1 B
Y N R00325
         4                 RES. CHIP 4700  5% 20X40            1 1 B
Y N R00412
         4                 RES. CHIP 4700  5% 20X40            1 1 B
Y N R00417
         4    0662057M92   RES. CHIP 5600  5% 20X40          5 1 1 B
Y N R01028
         4                 RES. CHIP 5600  5% 20X40            1 1 B
Y N R00413
         4                 RES. CHIP 5600  5% 20X40            1 1 B
Y N R00419
         4                 RES. CHIP 5600  5% 20X40            1 1 B
Y N R00739
         4                 RES. CHIP 5600  5% 20X40            1 1 B
Y N R00205
         4    0662057M98   RES. CHIP 10K   5% 20X40          5 1 1 B
Y N R00361
         4                 RES. CHIP 10K   5% 20X40            1 1 B
Y N R00332
         4                 RES. CHIP 10K   5% 20X40            1 1 B
Y N R00333
         4                 RES. CHIP 10K   5% 20X40            1 1 B
Y N R00334
         4                 RES. CHIP 10K   5% 20X40            1 1 B
Y N R00354
         4    0662057N01   RES CHIP 12K 5% 20X40            1 1 1 B
Y N R00608
         4    0662057N03   RES. CHIP 15K   5% 20X40          4 1 1 B
Y N R00226
         4                 RES. CHIP 15K   5% 20X40            1 1 B
Y N R00298
         4                 RES. CHIP 15K   5% 20X40            1 1 B
Y N R00434
         4                 RES. CHIP 15K   5% 20X40            1 1 B
Y N R00503
         4    0662057N10   RES. CHIP 30K   5% 20X40          1 1 1 B
Y N R00266
         4    0662057N11   RES. CHIP 33K   5% 20X40          2 1 1 B
Y N R01113
         4                 RES. CHIP 33K   5% 20X40            1 1 B
Y N R00607
         4    0662057N13   RES. CHIP 39K   5% 20X40          3 1 1 B
Y N R00201
         4                 RES. CHIP 39K   5% 20X40            1 1 B
Y N R00215
         4                 RES. CHIP 39K   5% 20X40            1 1 B
Y N R00433
         4    0662057N15   RES. CHIP 47K   5% 20X40          6 1 1 B
Y N R00208
         4                 RES. CHIP 47K   5% 20X40            1 1 B
Y N R00442
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         4                RES. CHIP 47K   5% 20X40           1 1 B
Y N R00445
         4                RES. CHIP 47K   5% 20X40           1 1 B
Y N R00513
         4                RES. CHIP 47K   5% 20X40           1 1 B
Y N R00516
         4                RES. CHIP 47K   5% 20X40           1 1 B
Y N R00555
         4    0662057N19  RES. CHIP 68K   5% 20X40         1 1 1 B
Y N R00357
         4    0662057N23  RES. CHIP 100K  5% 20X40         3 1 1 B
Y N R01021
         4                RES. CHIP 100K  5% 20X40           1 1 B
Y N R00207
         4                RES. CHIP 100K  5% 20X40           1 1 B
Y N R00606
         4    0662057N29  RES. CHIP 180K  5% 20X40         2 1 1 B
Y N R00202
         4                RES. CHIP 180K  5% 20X40           1 1 B
Y N R00447
         4    0662057N31  RES. CHIP 220K  5% 20X40         1 1 1 B
Y N R01022
         4    0662057N33  RES. CHIP 270K  5% 20X40         3 1 1 B
Y N R01016
         4                RES. CHIP 270K  5% 20X40           1 1 B
Y N R01017
         4                RES. CHIP 270K  5% 20X40           1 1 B
Y N R01110
         4    0662057N39  RES CHIP 470K 5% 20X40           1 1 1 B
Y N R01018
         4    0909195E01  SKT BOT ENTRY 2 POS              1 1 1 B
Y N J00802
         4    0909201T01  RECPT MOD 21 PIN SMD             1 1 1 B
Y N J601
         4    2109622N16  CAP CER CHIP NPO CLASS I         2 1 1 B
Y N C00208
         4                CAP CER CHIP NPO CLASS I           1 1 B
Y N C00237
         4    2113740A65  CAP CHIP REEL CL1 +/-30 270      2 1 1 B
Y N C00231
         4                CAP CHIP REEL CL1 +/-30 270        1 1 B
Y N C00437
         4    2113740A67  CAP CHIP REEL CL1 +/-30 330      2 1 1 B
Y N C00262
         4                CAP CHIP REEL CL1 +/-30 330        1 1 B
Y N C00366
         4    2113740A71  CAP CHIP REEL CL1 +/-30 470      1 1 1 B
Y N C00361
         4    2113740A79  CAP CHIP REEL CL1 +/-30 1000     1 1 1 B
Y N C00209
         4    2113740B81  CAP CHIP REEL CL1 +/-30 2400     2 1 1 B
Y N C00230
         4                CAP CHIP REEL CL1 +/-30 2400       1 1 B
Y N C00438
         4    2113740B84  CAP CHIP CL1 +/-30 3300 5%       1 1 1 B
Y N C00309
         4    2113740F03  CAP CHIP REEL CL1 +/-30 1.0      1 1 1 B
Y N C00247
         4    2113740F07  CAP CHIP REEL CL1 +/-30 1.5      2 1 1 B
Y N C00451
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LVL	COMPONENT_PART	DESCRIPTION	QTY	C	Q	M	D	P	REF
4		CAP CHIP REEL CL1 +/-30 1.5	1	1	1	B	Y	N	C00320
4	2113740F09	CAP CHIP REEL CL1 +/-30 1.8	1	1	1	B	Y	N	C00353
4	2113740F11	CAP CHIP REEL CL1 +/-30 2.2	1	1	1	B	Y	N	C00461
4	2113740F15	CAP CHIP REEL CL1 +/-30 3.3	2	1	1	B	Y	N	C00258
4		CAP CHIP REEL CL1 +/-30 3.3	1	1		B	Y	N	C00260
4	2113740F17	CAP CHIP REEL CL1 +/-30 3.9	1	1	1	B	Y	N	C00418
4	2113740F18	CAP CHIP REEL CL1 +/-30 4.3	1	1	1	B	Y	N	C00316
4	2113740F19	CAP CHIP REEL CL1 +/-30 4.7	6	1	1	B	Y	N	C00210
4		CAP CHIP REEL CL1 +/-30 4.7	1	1		B	Y	N	C00305
4		CAP CHIP REEL CL1 +/-30 4.7	1	1		B	Y	N	C00385
4		CAP CHIP REEL CL1 +/-30 4.7	1	1		B	Y	N	C00408
4		CAP CHIP REEL CL1 +/-30 4.7	1	1		B	Y	N	C00423
4		CAP CHIP REEL CL1 +/-30 4.7	1	1		B	Y	N	C00452
4	2113740F21	CAP CHIP REEL CL1 +/-30 5.6	1	1	1	B	Y	N	C00303
4	2113740F23	CAP CHIP REEL CL1 +/-30 6.8	4	1	1	B	Y	N	C00261
4		CAP CHIP REEL CL1 +/-30 6.8	1	1		B	Y	N	C00264
4		CAP CHIP REEL CL1 +/-30 6.8	1	1		B	Y	N	C00343
4		CAP CHIP REEL CL1 +/-30 6.8	1	1		B	Y	N	C00392
4	2113740F24	CAP CHIP REEL CL1 +/-30 7.5	1	1	1	B	Y	N	C00384
4	2113740F25	CAP CHIP REEL CL1 +/-30 8.2	2	1	1	B	Y	N	C00254
4		CAP CHIP REEL CL1 +/-30 8.2	1	1		B	Y	N	C00255
4	2113740F27	CAP CHIP REEL CL1 +/-30 10.0	10	1	1	B	Y	N	C00221
4		CAP CHIP REEL CL1 +/-30 10.0	1	1		B	Y	N	C00256
4		CAP CHIP REEL CL1 +/-30 10.0	1	1		B	Y	N	C00270
4		CAP CHIP REEL CL1 +/-30 10.0	1	1		B	Y	N	C00313
4		CAP CHIP REEL CL1 +/-30 10.0	1	1		B	Y	N	C00314
4		CAP CHIP REEL CL1 +/-30 10.0	1	1		B	Y	N	C00324

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         4                CAP CHIP REEL CL1 +/-30 10.0        1 1 B
Y N C00426
         4                CAP CHIP REEL CL1 +/-30 10.0        1 1 B
Y N C00444
         4                CAP CHIP REEL CL1 +/-30 10.0        1 1 B
Y N C00453
         4                CAP CHIP REEL CL1 +/-30 10.0        1 1 B
Y N C00454
         4    2113740F31  CAP CHIP REEL CL1 +/-30 15.0      1 1 1 B
Y N C00304
         4    2113740F35  CAP CHIP REEL CL1 +/-30 22.0     14 1 1 B
Y N C00206
         4                CAP CHIP REEL CL1 +/-30 22.0        1 1 B
Y N C00216
         4                CAP CHIP REEL CL1 +/-30 22.0        1 1 B
Y N C00222
         4                CAP CHIP REEL CL1 +/-30 22.0        1 1 B
Y N C00228
         4                CAP CHIP REEL CL1 +/-30 22.0        1 1 B
Y N C00250
         4                CAP CHIP REEL CL1 +/-30 22.0        1 1 B
Y N C00263
         4                CAP CHIP REEL CL1 +/-30 22.0        1 1 B
Y N C00289
         4                CAP CHIP REEL CL1 +/-30 22.0        1 1 B
Y N C00311
         4                CAP CHIP REEL CL1 +/-30 22.0        1 1 B
Y N C00317
         4                CAP CHIP REEL CL1 +/-30 22.0        1 1 B
Y N C00323
         4                CAP CHIP REEL CL1 +/-30 22.0        1 1 B
Y N C00362
         4                CAP CHIP REEL CL1 +/-30 22.0        1 1 B
Y N C00435
         4                CAP CHIP REEL CL1 +/-30 22.0        1 1 B
Y N C00436
         4                CAP CHIP REEL CL1 +/-30 22.0        1 1 B
Y N C00820
         4    2113740F37  CAP CHIP REEL CL1 +/-30 27.0      2 1 1 B
Y N C00227
         4                CAP CHIP REEL CL1 +/-30 27.0        1 1 B
Y N C00253
         4    2113740F39  CAP CHIP REEL CL1 +/-30 33.0      1 1 1 B
Y N C00409
         4    2113740F41  CAP CHIP REEL CL1 +/-30 39.0      2 1 1 B
Y N C00290
         4                CAP CHIP REEL CL1 +/-30 39.0        1 1 B
Y N C00367
         4    2113740F43  CAP CHIP REEL CL1 +/-30 47.0      5 1 1 B
Y N C01023
         4                CAP CHIP REEL CL1 +/-30 47.0        1 1 B
Y N C00236
         4                CAP CHIP REEL CL1 +/-30 47.0        1 1 B
Y N C00307
         4                CAP CHIP REEL CL1 +/-30 47.0        1 1 B
Y N C00326
         4                CAP CHIP REEL CL1 +/-30 47.0        1 1 B
Y N C00387
         4    2113740F45  CAP CHIP REEL CL1 +/-30 56         1 1 1 B
Y N C00201
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         4    2113740F47   CAP CHIP REEL CL1 +/-30 68        2 1 1 B
Y N C00202
         4                 CAP CHIP REEL CL1 +/-30 68          1 1 B
Y N C00434
         4    2113740F49   CAP CHIP REEL CL1 +/-30 82.0      1 1 1 B
Y N C00229
         4    2113740F51   CAP CHIP REEL CL1 +/-30 100.0     8 1 1 B
Y N C00224
         4                 CAP CHIP REEL CL1 +/-30 100.0       1 1 B
Y N C00251
                           Motorola Internal Use Only

                              SWF0246BB Bom Report
       LVL COMPONENT_PART  DESCRIPTION                      QTY C Q M
D P REF
---------- --------------- ------------------------------ ---- - - -
- - ------
         4    2113740F51   CAP CHIP REEL CL1 +/-30 100.0     8 1 1 B
Y N C00257
         4                 CAP CHIP REEL CL1 +/-30 100.0       1 1 B
Y N C00302
         4                 CAP CHIP REEL CL1 +/-30 100.0       1 1 B
Y N C00330
         4                 CAP CHIP REEL CL1 +/-30 100.0       1 1 B
Y N C00358
         4                 CAP CHIP REEL CL1 +/-30 100.0       1 1 B
Y N C00360
         4                 CAP CHIP REEL CL1 +/-30 100.0       1 1 B
Y N C00407
         4    2113740F55   CAP CHIP REEL CL1 +/-30 150       2 1 1 B
Y N C00315
         4                 CAP CHIP REEL CL1 +/-30 150         1 1 B
Y N C00415
         4    2113740F58   CAP CHIP REEL CL1 +/-30 200       1 1 1 B
Y N C00325
         4    2113740F61   CAP CHIP REEL CL1 +/130 270       2 1 1 B
Y N C00383
         4                 CAP CHIP REEL CL1 +/130 270         1 1 B
Y N C00510
         4    2113740F69   CAP CHIP CL1 +/-30 560  5%        1 4 1 B
Y N C00368
         4    2113740G13   CAP CERAMIC CHIP 2.7 PF +-.1PF    2 1 1 B
Y N C00306
         4                 CAP CERAMIC CHIP 2.7 PF +-.1PF      1 1 B
Y N C00327
         4    2113740G29   CAP CER CHIP 10PF 2%              1 1 1 B
Y N C00329
         4    2113741F13   CAP CHIP CL2 X7R REEL 330         1 1 1 B
Y N C00508
         4    2113741F19   CAP CHIP CL2 X7R REEL 560         1 1 1 B
Y N C00368
         4    2113741F25   CAP CHIP CL2 X7R REEL 1000       18 1 1 B
Y N C00217
         4                 CAP CHIP CL2 X7R REEL 1000          1 1 B
Y N C00232
         4                 CAP CHIP CL2 X7R REEL 1000          1 1 B
Y N C00242
         4                 CAP CHIP CL2 X7R REEL 1000          1 1 B
Y N C00243
         4                 CAP CHIP CL2 X7R REEL 1000          1 1 B
Y N C00244
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         4                CAP CHIP CL2 X7R REEL 1000          1 1 B
Y N C00246
         4                CAP CHIP CL2 X7R REEL 1000          1 1 B
Y N C00252
         4                CAP CHIP CL2 X7R REEL 1000          1 1 B
Y N C00308
         4                CAP CHIP CL2 X7R REEL 1000          1 1 B
Y N C00310
         4                CAP CHIP CL2 X7R REEL 1000          1 1 B
Y N C00338
         4                CAP CHIP CL2 X7R REEL 1000          1 1 B
Y N C00339
         4                CAP CHIP CL2 X7R REEL 1000          1 1 B
Y N C00401
         4                CAP CHIP CL2 X7R REEL 1000          1 1 B
Y N C00403
         4                CAP CHIP CL2 X7R REEL 1000          1 1 B
Y N C00406
         4                CAP CHIP CL2 X7R REEL 1000          1 1 B
Y N C00422
         4                CAP CHIP CL2 X7R REEL 1000          1 1 B
Y N C00424
         4                CAP CHIP CL2 X7R REEL 1000          1 1 B
Y N C00432
         4                CAP CHIP CL2 X7R REEL 1000          1 1 B
Y N C00509
         4    2113741F49  CAP CHIP CL2 X7R REEL .01UF      15 1 1 B
Y N C00203
         4                CAP CHIP CL2 X7R REEL .01UF         1 1 B
Y N C00204
         4                CAP CHIP CL2 X7R REEL .01UF         1 1 B
Y N C00211
         4                CAP CHIP CL2 X7R REEL .01UF         1 1 B
Y N C00213
         4                CAP CHIP CL2 X7R REEL .01UF         1 1 B
Y N C00218
         4                CAP CHIP CL2 X7R REEL .01UF         1 1 B
Y N C00220
         4                CAP CHIP CL2 X7R REEL .01UF         1 1 B
Y N C00234
         4                CAP CHIP CL2 X7R REEL .01UF         1 1 B
Y N C00300
         4                CAP CHIP CL2 X7R REEL .01UF         1 1 B
Y N C00312
         4                CAP CHIP CL2 X7R REEL .01UF         1 1 B
Y N C00357
         4                CAP CHIP CL2 X7R REEL .01UF         1 1 B
Y N C00335
         4                CAP CHIP CL2 X7R REEL .01UF         1 1 B
Y N C00337
         4                CAP CHIP CL2 X7R REEL .01UF         1 1 B
Y N C00388
         4                CAP CHIP CL2 X7R REEL .01UF         1 1 B
Y N C00420
         4                CAP CHIP CL2 X7R REEL .01UF         1 1 B
Y N C926
         4    2113743A19  CAP CHIP .100 UF 10% X7R           1 1 1 B
Y N C00331
         4    2113743A23  CAP CHIP .220 UF 10% X7R           1 1 1 B
Y N C00963
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         4    2113743G26   CAP CHIP 4.7  UF 16V +80-20%      2 1 1 B
Y N C00212
         4                 CAP CHIP 4.7  UF 16V +80-20%        1 1 B
Y N C00214
         4    2113743L11   CAP CHIP 560 PF 10% X7R            1 1 1 B
Y N C00412
         4    2113743L17   CAP CHIP 1000 PF 10% X7R           3 1 1 B
Y N C00365
         4                 CAP CHIP 1000 PF 10% X7R             1 1 B
Y N C00964
         4                 CAP CHIP 1000 PF 10% X7R             1 1 B
Y N C1024
         4    2113743L41   CAP CHIP 10000 PF 10% X7R          6 1 1 B
Y N C00417
         4                 CAP CHIP 10000 PF 10% X7R            1 1 B
Y N C00419
         4                 CAP CHIP 10000 PF 10% X7R            1 1 B
Y N C00427
                           Motorola Internal Use Only

                              SWF0246BB Bom Report
       LVL COMPONENT_PART  DESCRIPTION                      QTY C Q M
D P REF
---------- --------------- ------------------------------ ---- - - -
- - ------
         4    2113743L41   CAP CHIP 10000 PF 10% X7R          6 1 1 B
Y N C00433
         4                 CAP CHIP 10000 PF 10% X7R            1 1 B
Y N C00441
         4                 CAP CHIP 10000 PF 10% X7R            1 1 B
Y N C00503
         4    2113743M24   CAP CHIP 100000 PF +80-20% Y5V   13 1 1 B
Y N C01020
         4                 CAP CHIP 100000 PF +80-20% Y5V       1 1 B
Y N C00550
         4                 CAP CHIP 100000 PF +80-20% Y5V       1 1 B
Y N C00551
         4                 CAP CHIP 100000 PF +80-20% Y5V       1 1 B
Y N C00552
         4                 CAP CHIP 100000 PF +80-20% Y5V       1 1 B
Y N C00553
         4                 CAP CHIP 100000 PF +80-20% Y5V       1 1 B
Y N C00554
         4                 CAP CHIP 100000 PF +80-20% Y5V       1 1 B
Y N C00555
         4                 CAP CHIP 100000 PF +80-20% Y5V       1 1 B
Y N C00556
         4                 CAP CHIP 100000 PF +80-20% Y5V       1 1 B
Y N C00557
         4                 CAP CHIP 100000 PF +80-20% Y5V       1 1 B
Y N C00558
         4                 CAP CHIP 100000 PF +80-20% Y5V       1 1 B
Y N C00559
         4                 CAP CHIP 100000 PF +80-20% Y5V       1 1 B
Y N C00605
         4                 CAP CHIP 100000 PF +80-20% Y5V       1 1 B
Y N C00961
         4    2113743N03   CAP CHIP 1.0 PF +-.25PF COG        2 1 1 B
Y N C00200
         4                 CAP CHIP 1.0 PF +-.25PF COG          1 1 B
Y N C00233
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         4    2113743N12   CAP CHIP 2.7 PF +-.25PF COG       6 1 1 B
Y N C00917
         4                 CAP CHIP 2.7 PF +-.25PF COG         1 1 B
Y N C00919
         4                 CAP CHIP 2.7 PF +-.25PF COG         1 1 B
Y N C00923
         4                 CAP CHIP 2.7 PF +-.25PF COG         1 1 B
Y N C928
         4                 CAP CHIP 2.7 PF +-.25PF COG         1 1 B
Y N C929
         4                 CAP CHIP 2.7 PF +-.25PF COG         1 1 B
Y N C930
         4    2113743N14   CAP CHIP 3.3 PF +-.25PF COG       1 1 1 B
Y N C00410
         4    2113743N18   CAP CHIP 4.7 PF +-.25PF COG       1 1 1 B
Y N C00352
         4    2113743N23   CAP CHIP 7.5 PF + -.5PF COG       1 1 1 B
Y N C00447
         4    2113743N26   CAP CHIP 10.0 PF 5% COG           1 1 1 B
Y N C00336
         4    2113743N34   CAP CHIP 22.0 PF 5% COG           1 1 1 B
Y N C931
         4    2113743N36   CAP CHIP 27.0 PF 5% COG           2 1 1 B
Y N C00414
         4                 CAP CHIP 27.0 PF 5% COG             1 1 B
Y N C00525
         4    2113743N37   CAP CHIP 30.0 PF 5% COG           1 1 1 B
Y N C00448
         4    2113743N38   CAP CHIP 33.0 PF 5% COG           7 1 1 B
Y N C00421
         4                 CAP CHIP 33.0 PF 5% COG             1 1 B
Y N C00602
         4                 CAP CHIP 33.0 PF 5% COG             1 1 B
Y N C00607
         4                 CAP CHIP 33.0 PF 5% COG             1 1 B
Y N C00608
         4                 CAP CHIP 33.0 PF 5% COG             1 1 B
Y N C00813
         4                 CAP CHIP 33.0 PF 5% COG             1 1 B
Y N C00850
         4                 CAP CHIP 33.0 PF 5% COG             1 1 B
Y N C00860
         4    2113743N50   CAP CHIP 100 PF 5% COG            4 1 1 B
Y N C00439
         4                 CAP CHIP 100 PF 5% COG              1 1 B
Y N C00442
         4                 CAP CHIP 100 PF 5% COG              1 1 B
Y N C00450
         4                 CAP CHIP 100 PF 5% COG              1 1 B
Y N C00606
         4    2113743N54   CAP CHIP 150 PF 5% COG            4 1 1 B
Y N C00501
         4                 CAP CHIP 150 PF 5% COG              1 1 B
Y N C00502
         4                 CAP CHIP 150 PF 5% COG              1 1 B
Y N C00511
         4                 CAP CHIP 150 PF 5% COG              1 1 B
Y N C00962
         4    2113928A01   CAP CER CHIP 1.0 UF 10V           2 1 1 B
Y N C00512
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4		CAP CER CHIP 1.0 UF 10V		1	1	B	Y	N	C911
4	2113928J08	CAP CERAMIC CHIP 10.0UF	1	1	1	B	Y	N	C00351
4	2309121D09	CAP CHIP TANT 15 UF 10% 8.3V	1	1	1	B	Y	N	C00301
4	2311049A56	CAP TAN CHIP A/P 4.7 20 10	2	1	1	B	Y	N	C00205
4		CAP TAN CHIP A/P 4.7 20 10		1	1	B	Y	N	C00223
4	2409646M01	IND CER MULTILYR 3.9NH 1608	1	1	1	B	Y	N	L00450
4	2409646M05	IND CER MULTILYR 8.2NH 1608	1	1	1	B	Y	N	L00211
4	2409646M08	IND CER MULTILYR 15NH 1608	1	1	1	B	Y	N	L00210
4	2409646M12	IND CER MULTILYR 33NH 1608	1	1	1	B	Y	N	L00421
4	2409646M13	IND CER MULTILYR 39NH 1608	1	1	1	B	Y	N	L00300
4	2409646M81	IN CER MULTILYR 10 NH 1608	1	1	1	B	Y	N	L00412
4	2409646M83	IN CER MULTILYR 15 NH 1608	1	1	1	B	Y	N	L00413
4	2409646M86	IN CER MULTILYR 27 NH 1608	1	1	1	B	Y	N	L00433

LVL	COMPONENT_PART	DESCRIPTION	QTY	C	Q	M	D	P	REF
4	2409646M88	IN CER MULTILYR 39 NH 1608	1	1	1	B	Y	N	L00445
4	2409646M95	IN CER MULTILYR	1	1	1	B	Y	N	L00203
4	2409704K45	IND CHIP MULTILYR 47NH 2012	1	1	1	B	Y	N	L00414
4	2409704K52	IND CHIP MULTILYR 180NH 2012	1	1	1	B	Y	N	L00440
4	2462587P36	CHIP IND 100000 NH	1	1	1	B	Y	N	L00501
4	2462587Q38	IND CHIP 180 NH 10%	1	1	1	B	Y	N	L00431
4	2462587Q39	IND CHIP 220 NH 10%	1	1	1	B	Y	N	L00401
4	2609225D01	SHIELD VCO 1	1	1	1	B	Y	N	SH0030
4	2609226D01	SHIELD VCO 2	1	1	1	B	Y	N	SH0031
4	2609227D01	SHIELD RCVR	1	1	1	B	Y	N	SH0032
4	2609228D01	SHIELD GIFSYN	1	1	1	B	Y	N	SH0033
4	2609229D01	SHIELD TIC	1	1	1	B	Y	N	SH0034
4	2609230D01	SHIELD MODEM	1	1	1	B	Y	N	SH0035
4	4009169E01	SW ASSY DET/SMART CARD BLOCK	1	1	1	B	Y	N	J00900

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         4    4209388S01   CLIP TOP FLEX                    4 1 1 B
Y N SH0060
         4                 CLIP TOP FLEX                      1 1 B
Y N SH0061
         4                 CLIP TOP FLEX                      1 1 B
Y N SH0062
         4                 CLIP TOP FLEX                      1 1 B
Y N SH0063
         4    4809118D01   LED BICOLOR LNJ107W5PRA1         1 1 1 B
Y N CR0908
         4    4809527E20   TSTR NPN RF 2SC4784 SC70         1 1 1 B
Y N Q00418
         4    4809579E02   TSTR MOSFET N-CHAN 25K1830       1 1 1 B
Y N Q01009
         4    4809579E07   TSTR MOSFET P-CHAN IRF7004       4 1 1 B
Y N Q01002
         4                 TSTR MOSFET P-CHAN IRF7004         1 1 B
Y N Q01003
         4                 TSTR MOSFET P-CHAN IRF7004         1 1 B
Y N Q01004
         4                 TSTR MOSFET P-CHAN IRF7004         1 1 B
Y N Q01005
         4    4809579E16   TSTR MOSFET N-CHAN TN0200T       1 1 1 B
Y N Q01014
         4    4809579E17   TSTR MOSFET P-CHAN SI9424        4 1 1 B
Y N Q01007
         4                 TSTR MOSFET P-CHAN SI9424          1 1 B
Y N Q01008
         4                 TSTR MOSFET P-CHAN SI9424          1 1 B
Y N Q00301
         4                 TSTR MOSFET P-CHAN SI9424          1 1 B
Y N Q00999
         4    4809579E18   TSTR MOSFET P-CHAN TP0101T       3 1 1 B
Y N Q01013
         4                 TSTR MOSFET P-CHAN TP0101T         1 1 B
Y N Q00202
         4                 TSTR MOSFET P-CHAN TP0101T         1 1 B
Y N Q00203
         4    4809605E02   TSTR SIG NPN 2SC4617             6 1 1 B
Y N Q00201
         4                 TSTR SIG NPN 2SC4617               1 1 B
Y N Q00305
         4                 TSTR SIG NPN 2SC4617               1 1 B
Y N Q00330
         4                 TSTR SIG NPN 2SC4617               1 1 B
Y N Q00332
         4                 TSTR SIG NPN 2SC4617               1 1 B
Y N Q00440
         4                 TSTR SIG NPN 2SC4617               1 1 B
Y N Q00605
         4    4809606E02   DIODE DUAL ARRAY DAN222           1 1 1 B
Y N CR0606
         4    4809606E08   DIODE DUAL SCHOTTKEY RB715F       1 1 1 B
Y N CR0607
         4    4809607E02   TSTR SIG PNP 25A1774              2 1 1 B
Y N Q00331
         4                 TSTR SIG PNP 25A1774               1 1 B
Y N Q00441
         4    4809607E04   TSTR SIG PNP 2SB1132 SOT89        1 1 1 B
Y N Q00604
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         4    4809607E05   TSTR PNP DTA143EE                3 1 1 B
Y N Q00306
         4                 TSTR PNP DTA143EE                  1 1 B
Y N Q00501
         4                 TSTR PNP DTA143EE                  1 1 B
Y N Q00502
         4    4809608E03   TSTR DIG PNP DTA114YE            1 1 1 B
Y N Q00446
         4    4809612J20   XTAL 13MHZ 20PPM SMD 5X7 MM      1 1 1 B
Y N Y00201
         4    4809641F02   DIODE VCTR ABRUPT SMD SOD232     2 1 1 B
Y N CR0250
         4                 DIODE VCTR ABRUPT SMD SOD232       1 1 B
Y N CR0300
         4    4809641F03   DIODE VCTR ABRUPT SMD SOD323     2 1 1 B
Y N CR0203
         4                 DIODE VCTR ABRUPT SMD SOD323       1 1 B
Y N CR0431
         4    4809641F04   DIODE VCTR SMV1204-70 SOT23      1 1 1 B
Y N CR0201
         4    4809788E06   DIODE ZENER 6.8V UDZ6.8B         4 1 1 B
Y N CR0604
         4                 DIODE ZENER 6.8V UDZ6.8B           1 1 B
Y N VR0602
         4                 DIODE ZENER 6.8V UDZ6.8B           1 1 B
Y N VR0603
         4                 DIODE ZENER 6.8V UDZ6.8B           1 1 B
Y N VR0607
         4    4809939C08   TSTR DUAL PNP/PNP UMA6NTL        2 1 1 B
Y N Q00442
         4                 TSTR DUAL PNP/PNP UMA6NTL          1 1 B
Y N Q00443
         4    4809940E01   TSTR NPN MRF947 A/P              5 1 1 B
Y N Q00250
                           Motorola Internal Use Only

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       LVL COMPONENT_PART  DESCRIPTION                     QTY C Q M
D P REF
---------- --------------- ------------------------------ ---- - - -
- - ------
         4    4809940E01   TSTR NPN MRF947 A/P              5 1 1 B
Y N Q00251
         4                 TSTR NPN MRF947 A/P                1 1 B
Y N Q00252
         4                 TSTR NPN MRF947 A/P                1 1 B
Y N Q00420
         4                 TSTR NPN MRF947 A/P                1 1 B
Y N Q00421
         4    4809948D06   DIODE                            1 1 1 B
Y N CR0390
         4    4813827A02   TSTR NPN SML SIG MMBR571LT1 7X   2 1 1 B
Y N Q00300
         4                 TSTR NPN SML SIG MMBR571LT1 7X     1 1 B
Y N Q00303
         4    5109522E23   IC SNGL INV GATE TC7SH04FU       1 1 1 B
Y N U00907
         4    5109522E25   IC SNGL NOR GATE TC7SH02FU       3 1 1 B
Y N U00904
         4                 IC SNGL NOR GATE TC7SH02FU         1 1 B
Y N U00908
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         4                IC SNGL NOR GATE TC7SH02FU          1 1 B
Y N U00909
         4    5109572E03  IC GAAS RF SW DPDT SW-363         1 1 1 B
Y N U00401
         4    5109632D91  IC CUST PAC SC79948DTB 14TSSOP    1 1 1 B
Y N U00310
         4    5109632D92  IC CUST GIFSYN 5.2 F2KHAA9712     1 1 1 B
Y N U00201
         4    5109632D94  IC CUST BICMOS TIC 5.2 14SOIC     1 1 1 B
Y N U00300
         4    5109781E41  IC 2.7V REG TC55RP2702EMB         1 1 1 B
Y N Q00103
         4    5109781E57  IC LIN VOLT DECT 3V PST995MNR     1 1 1 B
Y N U00903
         4    5109817F11  IC VOLT DECT 2.8V PST995PNR       1 1 1 B
Y N U00911
         4    5109908K30  IC RF PA GAAS 2.5 CGY93           1 1 1 B
Y N U00301
         4    5199281C07  IC MASK DSP MODEM SC390234PU      1 1 1 B
Y N U00501
         4    8485606G02  PCB GSM DUAL CARD ALEX            1 1 1 B
Y N PCB
         4    9109247M01  FLTR SAW BP 947MHZ 3X3MM SMD      1 1 1 B
Y N FL0452
         4    9109247M02  FLTR SAW BP 947MHZ 3X3MM SMD      1 4 1 B
Y N FL0452
         4    9109449C01  FILTER SAW 153 MHZ                1 1 1 B
Y N FL0420
         4    9109450C04  FLTR SAW BP 947.5MHZ SMD          1 1 1 B
Y N FL0451
         4    9109451C01  FLTR CER LC 787MHZ SMD            1 1 1 B
Y N FL0453
         3   5402139T01   LABEL SET COMPOSITE               1 4 1 B
Y N
         3   5402139T02   ESN COMPOSITE LABEL SET           1 1 1 B
Y N
         3   5402287T01   SMT IDENT LABEL                   1 1 1 B
Y N
         2  SYN5381A      GSM RAE 19 KEY BD                 1 4 1 M
Y N
         3   4009106S02   SW ARRAY KYPD METAL DMS 19POS     1 1 1 B
Y N
         3   7209185S01   LCD DSPL 96X32 PIX ICONS          1 4 1 B
Y N
         3   7209185S06   LCD DSPL 96X32 PIX ICON RAE       1 1 1 B
Y N
         2  SYN6210A      GSM STARTAC 110 KYBD              1 1 1 M
Y N
         3   (PRA2811)    PRELIMINARY BILL OF MATERIAL      1 2 1
Y N
         3   4009106S02   SW ARRAY KYPD METAL DMS 19POS     1 1 1 B
Y N
         3   7209185S01   LCD DSPL 96X32 PIX ICONS          1 4 1 B
Y N
         3   7209185S06   LCD DSPL 96X32 PIX ICON RAE       1 1 1 B
Y N
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DCS STARTAC - SUG 1043 - FULL PARTS LISTING

1	SHN6319A	HSNG DCS UNIQUE 17KEY BLK	1	1	1	M	Y Y
2	0109212D01	ASSY HSNG XCVR FRNT BLK	1	1	1	B	Y N
2	0109284S01	ASSY REAR AUX	1	1	1	B	Y N
3	0109470S01	ASSY GSM AUX FLEX	1	2	1	B	Y N
4	4209389S01	CLIP BOTTOM FLEX	1	2	1	B	Y N
4	8409390S01	PCB AUX FLEX INTERCONNECT	1	2	1	B	Y N
3	1509283S01	HSNG REAR AUX	1	2	1	B	Y N
3	3609217D01	KNOB EJECT	1	2	1	B	Y N
3	4209218D01	CLIP EJECT/CARD COMPRESSION	1	2	1	B	Y N
3	4309134E01	BUSHING THREADED REAR HSNG	1	2	1	B	Y N
3	6109219D01	LIGHTGUIDE ALERT	1	2	1	B	Y N
2	0109322D01	ASSY LENS RAE	1	1	1	B	Y N
2	0109485D01	ASSY HSNG MAIN FLIP BLK	1	1	1	B	Y N
3	0109207D01	ASSEMBLY FLIP	1	2	1	B	Y N
4	1109210D01	ADHESIVE RTC BATTERY	1	2	1	B	Y N
4	1109410R01	ADHESIVE SPEAKER	1	2	1	B	Y N
4	3909492B01	CONTACT BLOCK BATTERY	2	2	1	B	Y N
4	5009076E01	SPKR DYN EARPC 20X50 MM	1	2	1	B	Y N
4	5909127D03	MOTOR VIBRATOR 0.7V 10K RPM	1	2	1	B	Y N
4	6009519L03	BATT LI COIN CELL	1	2	1	B	Y N
4	8409420D01	PCB FLEX BD	1	2	1	B	Y N
3	0109486D01	ASSY MAIN FLIP GSM	1	2	1	B	Y N
4	1509222D01	HSNG SPEAKER FRNT	1	2	1	B	Y N
4	1509223D01	HSNG MAIN FLIP BLK	1	2	1	B	Y N
4	3209208D01	GASKET SPEAKER	1	2	1	B	Y N
4	5983583N18	MAGNET GSM RAE	1	2	1	B	Y N
3	1509210E01	HSNG FLEX BARREL BLK	1	2	1	B	Y N
3	1509224D01	HSNG SPEAKER REAR	1	2	1	B	Y N
3	3509120R01	FELT REAR SPKR	1	2	1	B	Y N
3	7509532K12	PAD SHOCK	1	2	1	B	Y N
1	SUG1044A	XCVR CORE DCS CLAM RAE	1	1	1	M	Y Y
2	SHN6227A	HSNG & HDW DCS RAE COMMON	1	1	1	M	Y Y
3	0309333C01	SCREW TRILOBE W/CAP WASHER	2	1	1	B	Y N
3	0509220D01	GROMMET MIC	1	1	1	B	Y N
3	0509221D01	GROMMET ALERT	1	1	1	B	Y N
3	1109155J01	ADHESIVE DCA COVER	1	1	1	B	Y N
3	1109387L01	ALERT GROMMET ADHESIVE	1	1	1	B	Y N
3	1509136D01	HSNG FLEX COVER	1	1	1	B	Y N
3	2609231D01	SHIELD LOGIC	1	1	1	B	Y N
3	3509001R01	SCREEN ALERT	1	1	1	B	Y N
3	3709013J01	TUBE ANTENNA S.S.	1	1	1	B	Y N
3	3809170E01	ACTR KYPD GSM RAE	1	1	1	B	Y N
3	4709050R01	SHAFT GSM RIGHT	1	1	1	B	Y N
3	5009536H15	MIC LEADED W/PINS	1	1	1	B	Y N
3	5409150R01	LABEL FLEX	1	1	1	B	Y N

3 5509242E01 HINGE GSM 1 1 1 B Y N
3 7509165R01 PAD SHOCK 1 1 1 B Y N
3 8509173J01 ANT DIRECT CNTCT 1.8GHZ DCS 1 1 1 B Y N
2 SLG1003A BD SET DCS CLAM RAE 1 1 1 M Y Y
3 SLG4014A XCVR BD DCS 1800 RAE 1 1 1 M Y Y
4 0109026A08 XCVR BD RAE DCS TOP SIDE 1 1 1 M Y Y
5 0609118R01 VARISTOR CHIP 0805 SMD 2 1 1 B Y N
5 0609591M39 RES CHIP DUAL 15K 5% 0.63W 4 1 1 B Y N
5 0609591M45 RES CHIP DUAL 47K 5% 0.63W 6 1 1 B Y N
5 0660076N01 RES CHIP 10 5 1/16 0603 2 1 1 B Y N
5 0662057M01 RES. CHIP 0 5% 20X40 4 1 1 B Y N
5 0662057M26 RES. CHIP 10 5% 20X40 5 1 1 B Y N
5 0662057M50 RES. CHIP 100 5% 20X40 8 1 1 B Y N
5 0662057M58 RES. CHIP 220 5% 20X40 1 1 1 B Y N
5 0662057M61 RES CHIP 300 5% 20X40 1 1 1 B Y N
5 0662057M68 RES. CHIP 560 5% 20X40 3 1 1 B Y N
5 0662057M74 RES. CHIP 1000 5% 20X40 7 1 1 B Y N
5 0662057M78 RES. CHIP 1500 5% 20X40 1 1 1 B Y N
5 0662057M80 RES. CHIP 1800 5% 20X40 1 1 1 B Y N
5 0662057M90 RES. CHIP 4700 5% 20X40 6 1 1 B Y N
5 0662057M92 RES. CHIP 5600 5% 20X40 1 1 1 B Y N
5 0662057M98 RES. CHIP 10K 5% 20X40 13 1 1 B Y N
5 0662057N03 RES. CHIP 15K 5% 20X40 16 1 1 B Y N
5 0662057N05 RES. CHIP 18K 5% 20X40 4 1 1 B Y N
5 0662057N06 RES. CHIP 20K 5% 20X40 2 1 1 B Y N
5 0662057N07 RES. CHIP 22K 5% 20X40 1 1 1 B Y N
5 0662057N09 RES. CHIP 27K 5% 20X40 2 1 1 B Y N
5 0662057N15 RES. CHIP 47K 5% 20X40 11 1 1 B Y N
5 0662057N19 RES. CHIP 68K 5% 20X40 1 1 1 B Y N
5 0662057N23 RES. CHIP 100K 5% 20X40 8 1 1 B Y N
5 0662057N29 RES. CHIP 180K 5% 20X40 3 1 1 B Y N
5 0662057N33 RES. CHIP 270K 5% 20X40 1 1 1 B Y N
5 0662057N39 RES CHIP 470K 5% 20X40 4 1 1 B Y N
5 0680195M64 RES 0.24 OHM 1/2W 1 1 1 B Y N
5 0909449B04 RECEPT MOD 15PIN INSMLD 1 1 1 B Y N
5 2109622N06 CAP CER CHIP NPO CLASS I 1 1 1 B Y N
5 2113740F20 CAP CHIP REEL CL1 +/-30 5.1 1 1 1 B Y N
5 2113740F35 CAP CHIP REEL CL1 +/-30 22.0 1 1 1 B Y N
5 2113741F25 CAP CHIP CL2 X7R REEL 1000 1 1 1 B Y N
5 2113741F49 CAP CHIP CL2 X7R REEL .01UF 2 1 1 B Y N
5 2113743A27 CAP CHIP .470 UF 10% 16V 2 1 1 B Y N
5 2113743E07 CER CHIP CAP .022UF 1 1 1 B Y N
5 2113743E11 CAP CHIP .039 UF 10% X7R 1 1 1 B Y N
5 2113743E12 CAP CHIP .047 UF 10% X7R 12 1 1 B Y N
5 2113743E20 CAP CHIP .10 UF 10% 15 1 1 B Y N
5 2113743H14 CAP CHIP 10.0 UF 16V +80-20% 3 1 1 B Y N
5 2113743L05 CAP CHIP 330 PF 10% X7R 1 1 1 B Y N
5 2113743L17 CAP CHIP 1000 PF 10% X7R 1 1 1 B Y N
5 2113743L21 CAP CHIP 1500 PF 10% X7R 2 1 1 B Y N
5 2113743L41 CAP CHIP 10000 PF 10% X7R 3 1 1 B Y N

5 2113743M08 CAP CHIP 22000 PF +80-20% Y5V 2 1 1 B Y N
5 2113743M24 CAP CHIP 100000 PF +80-20% Y5V 3 1 1 B Y N
5 2113743N12 CAP CHIP 2.7 PF +-.25PF COG 1 1 1 B Y N
5 2113743N14 CAP CHIP 3.3 PF +-.25PF COG 1 1 1 B Y N
5 2113743N26 CAP CHIP 10.0 PF 5% COG 28 1 1 B Y N
5 2113743N50 CAP CHIP 100 PF 5% COG 1 1 1 B Y N
5 2113743N54 CAP CHIP 150 PF 5% COG 1 1 1 B Y N
5 2113928J06 CAP CER CHIP 4.7 UF 10% 10V 5 1 1 B Y N
5 2309121D19 CAP CHIP TANT 10 UF 10% 10 V 2 1 1 B Y N
5 2309121D23 CAP CHIP TANT 68 UF 10% 10 V 1 1 1 B Y N
5 2311049A54 CAP TAN CHIP A/P 3.3 20 16 4 1 1 B Y N
5 2311049A56 CAP TAN CHIP A/P 4.7 20 10 2 1 1 B Y N
5 2462587V24 CHIP IND 15 NH 5% 0805 1 1 1 B Y N
5 2509306J01 CHOKE 15 UH SMD 1 1 1 B Y N
5 2609827G03 SHIELD SPACER 1 1 1 B Y N
5 2809454C02 PLUG LO PROFILE SMD 32 POS 1 1 1 B Y N
5 3909578M01 CONTACT BATT SMT 4 1 1 B Y N
5 4009060E01 SW TACTILE SMD 3 1 1 B Y N
5 4209189E01 CLIP LOGIC SHIELD #1 3 1 1 B Y N
5 4209190E01 CLIP LOGIC SHIELD #2 3 1 1 B Y N
5 4209233D01 CLIP ANTENNA TUBE 1 1 1 B Y N
5 4209480E01 CLIP ANTENNA 2 1 1 B Y N
5 4809579E09 TSTR MOSFET P-CHAN 2SJ346 1 1 1 B Y N
5 4809579E11 TSTR MOSFET P-CHAN NDS0601 1 1 1 B Y N
5 4809579E16 TSTR MOSFET N-CHAN TN0200T 1 1 1 B Y N
5 4809579E17 TSTR MOSFET P-CHAN SI9424 1 1 1 B Y N
5 4809579E18 TSTR MOSFET P-CHAN TP0101T 1 1 1 B Y N
5 4809605E02 TSTR SIG NPN 2SC4617 2 1 1 B Y N
5 4809606E02 DIODE DUAL ARRAY DAN222 2 1 1 B Y N
5 4809606E03 DIODE DUAL ARRAY DAP222 4 1 1 B Y N
5 4809606E07 DIODE DUAL ARRAY DA221 4 1 1 B Y N
5 4809606E08 DIODE DUAL SCHOTTKEY RB715F 1 1 1 B Y N
5 4809607E02 TSTR SIG PNP 25A1774 2 1 1 B Y N
5 4809608E03 TSTR DIG PNP DTA114YE 2 1 1 B Y N
5 4809653F03 DIODE SCHOTTKY 1A 10BQ040 SMD 3 1 1 B Y N
5 4809788E06 DIODE ZENER 6.8V UDZ6.8B 5 1 1 B Y N
5 4809788E08 DIODE ZENER 8.2V UDZTE178.2B 3 1 1 B Y N
5 4809939C04 TSTR DUAL PNP/NPN UMC3 2 1 1 B Y N
5 4809939C05 TSTR DUAL NPN/PNP UMH 5 1 1 1 B Y N
5 4809940E02 TSTR DIG NPN DTC114YE 1 1 1 B Y N
5 4809940E03 TSTR DIG NPN DTC114TE 1 1 1 B Y N
5 4809995L05 XTAL QUARTZ 32.768KHZ CC4V-T1 1 1 1 B Y N
5 4813823A07 XSTR N-CH TMOS FET 2N7002LT1 1 1 1 B Y N
5 4813824A21 XSTR PNP 60V .6A GENP B=100 1 1 1 B Y N
5 5009473S01 ALERT EM 5V SMD 1 1 1 B Y N
5 5109522E10 IC 3-INV LMOS TC7W04FU 1 1 1 B Y N
5 5109522E13 IC BILAT SW TC7S66FU 4 1 1 B Y N
5 5109632D44 IC CUST DIG POT/ATTN DS1866 1 1 1 B Y N
5 5109632D54 IC CUST BICMOS GCAP 48QFP 1 1 1 B Y N
5 5109632D54 IC CUST BICMOS GCAP 48QFP 1 4 1 B Y N

5 5109688L09 IC SRAM 64KX16 M5M51016BVP 1 1 1 B Y N
5 5109743E12 IC ASIC BIC 4.01 1 4 1 B Y N
5 5109743E13 IC ASIC BIC 4.01 S38138EC10 1 1 1 B Y N
5 5109781E47 IC LIN CLCK DBLR W42C70 1 1 1 B Y N
5 5109781E50 IC LIN 5V REG LM2980 SOT23 1 1 1 B Y N
5 5109841C30 IC MCU SCSF416776 1 1 1 B Y N
5 5109920D12 IC DC-DC CONV INVDBLR 682EOA 1 1 1 B Y N
5 5109920D15 IC PCM CODEC MC14LC5480SDR2 1 1 1 B Y N
5 5199245A01 IC FLASH PROM 512KX16 28F800-B 1 1 1 B Y N
5 5199285C01 IC MASK DSP 1616-S31EEK 38IW 1 1 1 B Y N
5 5199295A01 IC ROM 64 BIT DS2401 FLIP CHIP 1 1 1 B Y N
5 5199301A01 IC EEPROM SPCL 8KX8 28BV64 1 1 1 B Y N
4 0109026A09 XCVR BD RAE DCS BOTTOM SIDE 1 1 1 M Y Y
5 0609591M37 RES CHIP DUAL 10K 5% 0.63W 3 1 1 B Y N
5 0660076N57 RES CHIP 2200 OHM 1/16 W 1 1 1 B Y N
5 0662057M01 RES. CHIP 0 5% 20X40 3 1 1 B Y N
5 0662057M26 RES. CHIP 10 5% 20X40 4 1 1 B Y N
5 0662057M30 RES. CHIP 15 5% 20X40 2 1 1 B Y N
5 0662057M34 RES. CHIP 22 5% 20X40 1 1 1 B Y N
5 0662057M36 RES. CHIP 27 5% 20X40 1 1 1 B Y N
5 0662057M38 RES CHIP 33 5% 20X40 3 1 1 B Y N
5 0662057M43 RES. CHIP 51 5% 20X40 1 1 1 B Y N
5 0662057M44 RES CHIP 180K 5% 20X40 1 1 1 B Y N
5 0662057M48 RES. CHIP 82 5% 20X40 1 1 1 B Y N
5 0662057M50 RES. CHIP 100 5% 20X40 1 1 1 B Y N
5 0662057M52 RES. CHIP 120 5% 20X40 2 1 1 B Y N
5 0662057M54 RES. CHIP 150 5% 20X40 3 1 1 B Y N
5 0662057M56 RES. CHIP 180 5% 20X40 1 1 1 B Y N
5 0662057M58 RES. CHIP 220 5% 20X40 4 1 1 B Y N
5 0662057M60 RES. CHIP 270 5% 20X40 1 1 1 B Y N
5 0662057M62 RES. CHIP 330 5% 20X40 3 1 1 B Y N
5 0662057M66 RES. CHIP 470 5% 20X40 1 1 1 B Y N
5 0662057M74 RES. CHIP 1000 5% 20X40 8 1 1 B Y N
5 0662057M76 RES. CHIP 1200 5% 20X40 1 1 1 B Y N
5 0662057M78 RES. CHIP 1500 5% 20X40 1 1 1 B Y N
5 0662057M80 RES. CHIP 1800 5% 20X40 1 1 1 B Y N
5 0662057M81 RES. CHIP 2000 5% 20X40 2 1 1 B Y N
5 0662057M82 RES. CHIP 2200 5% 20X40 4 1 1 B Y N
5 0662057M83 RES CHIP 2400 5% 20X40 1 1 1 B Y N
5 0662057M84 RES. CHIP 2700 5% 20X40 3 1 1 B Y N
5 0662057M85 RES. CHIP 3000 5% 20X40 1 1 1 B Y N
5 0662057M86 RES. CHIP 3300 5% 20X40 1 1 1 B Y N
5 0662057M90 RES. CHIP 4700 5% 20X40 4 1 1 B Y N
5 0662057M92 RES. CHIP 5600 5% 20X40 4 1 1 B Y N
5 0662057M98 RES. CHIP 10K 5% 20X40 5 1 1 B Y N
5 0662057N01 RES CHIP 12K 5% 20X40 2 1 1 B Y N
5 0662057N03 RES. CHIP 15K 5% 20X40 2 1 1 B Y N
5 0662057N06 RES. CHIP 20K 5% 20X40 1 1 1 B Y N
5 0662057N07 RES. CHIP 22K 5% 20X40 1 1 1 B Y N
5 0662057N11 RES. CHIP 33K 5% 20X40 1 1 1 B Y N

5	0662057N15	RES. CHIP 47K 5% 20X40	5	1	1	B	Y	N
5	0662057N19	RES. CHIP 68K 5% 20X40	1	1	1	B	Y	N
5	0662057N23	RES. CHIP 100K 5% 20X40	2	1	1	B	Y	N
5	0662057N29	RES. CHIP 180K 5% 20X40	2	1	1	B	Y	N
5	0662057N31	RES. CHIP 220K 5% 20X40	1	1	1	B	Y	N
5	0662057N33	RES. CHIP 270K 5% 20X40	3	1	1	B	Y	N
5	0662057N39	RES CHIP 470K 5% 20X40	2	1	1	B	Y	N
5	0909059E01	RECPT ZIF 16 POS SMD	1	1	1	B	Y	N
5	0909195E01	SKT BOT ENTRY 2 POS	1	1	1	B	Y	N
5	2109622N06	CAP CER CHIP NPO CLASS I	1	1	1	B	Y	N
5	2109622N14	CAP CER CHIP NPO CLASS I	1	1	1	B	Y	N
5	2109622N16	CAP CER CHIP NPO CLASS I	1	1	1	B	Y	N
5	2113740A01	CAP CHIP REEL CL1 +/-30 .5	1	1	1	B	Y	N
5	2113740A63	CAP CHIP REEL CL1 +/-30 220	1	1	1	B	Y	N
5	2113740A65	CAP CHIP REEL CL1 +/-30 270	4	1	1	B	Y	N
5	2113740A73	CAP CHIP REEL CL1 +/-30 560	1	1	1	B	Y	N
5	2113740B78	CAP CHIP REEL CL1 +/-30 1800	1	1	1	B	Y	N
5	2113740B81	CAP CHIP REEL CL1 +/-30 2400	1	1	1	B	Y	N
5	2113740F03	CAP CHIP REEL CL1 +/-30 1.0	4	1	1	B	Y	N
5	2113740F07	CAP CHIP REEL CL1 +/-30 1.5	5	1	1	B	Y	N
5	2113740F09	CAP CHIP REEL CL1 +/-30 1.8	1	1	1	B	Y	N
5	2113740F11	CAP CHIP REEL CL1 +/-30 2.2	3	1	1	B	Y	N
5	2113740F12	CAP CHIP REEL CL1 +/-30 2.4	1	1	1	B	Y	N
5	2113740F13	CAP CHIP REEL CL1 +/-30 2.7	2	1	1	B	Y	N
5	2113740F15	CAP CHIP REEL CL1 +/-30 3.3	4	1	1	B	Y	N
5	2113740F19	CAP CHIP REEL CL1 +/-30 4.7	3	1	1	B	Y	N
5	2113740F21	CAP CHIP REEL CL1 +/-30 5.6	1	1	1	B	Y	N
5	2113740F23	CAP CHIP REEL CL1 +/-30 6.8	2	1	1	B	Y	N
5	2113740F25	CAP CHIP REEL CL1 +/-30 8.2	1	1	1	B	Y	N
5	2113740F27	CAP CHIP REEL CL1 +/-30 10.0	19	1	1	B	Y	N
5	2113740F29	CAP CHIP REEL CL1 +/-30 12	1	1	1	B	Y	N
5	2113740F31	CAP CHIP REEL CL1 +/-30 15.0	2	1	1	B	Y	N
5	2113740F33	CAP CHIP REEL CL1 +/-30 18.0	2	1	1	B	Y	N
5	2113740F35	CAP CHIP REEL CL1 +/-30 22.0	4	1	1	B	Y	N
5	2113740F37	CAP CHIP REEL CL1 +/-30 27.0	2	1	1	B	Y	N
5	2113740F39	CAP CHIP REEL CL1 +/-30 33.0	1	1	1	B	Y	N
5	2113740F43	CAP CHIP REEL CL1 +/-30 47.0	1	1	1	B	Y	N
5	2113740F47	CAP CHIP REEL CL1 +/-30 68	1	1	1	B	Y	N
5	2113740F49	CAP CHIP REEL CL1 +/-30 82.0	1	1	1	B	Y	N
5	2113740F51	CAP CHIP REEL CL1 +/-30 100.0	3	1	1	B	Y	N
5	2113740F57	CAP CHIP REEL CL1 +/-30 180	1	1	1	B	Y	N
5	2113740F59	CAP CHIP REEL CL1 +/-30 220.0	1	1	1	B	Y	N
5	2113740F61	CAP CHIP REEL CL1 +/130 270	1	1	1	B	Y	N
5	2113740G29	CAP CER CHIP 10PF 2%	1	1	1	B	Y	N
5	2113741B39	CAP CHIP CL2 X7R REEL 5600	1	1	1	B	Y	N
5	2113741F13	CAP CHIP CL2 X7R REEL 330	1	1	1	B	Y	N
5	2113741F25	CAP CHIP CL2 X7R REEL 1000	13	1	1	B	Y	N
5	2113741F41	CAP CHIP CL2 X7R REEL 4700	1	1	1	B	Y	N
5	2113741F49	CAP CHIP CL2 X7R REEL .01UF	9	1	1	B	Y	N
5	2113743A23	CAP CHIP .220 UF 10% X7R	1	1	1	B	Y	N

5 2113743L17 CAP CHIP 1000 PF 10% X7R 9 1 1 B Y N
5 2113743L41 CAP CHIP 10000 PF 10% X7R 5 1 1 B Y N
5 2113743M24 CAP CHIP 100000 PF +80-20% Y5V 13 1 1 B Y N
5 2113743N05 CAP CHIP 1.2 PF +-.25PF COG 1 1 1 B Y N
5 2113743N07 CAP CHIP 1.5 PF +-.25PF COG 1 1 1 B Y N
5 2113743N12 CAP CHIP 2.7 PF +-.25PF COG 3 1 1 B Y N
5 2113743N14 CAP CHIP 3.3 PF +-.25PF COG 1 1 1 B Y N
5 2113743N18 CAP CHIP 4.7 PF +-.25PF COG 5 1 1 B Y N
5 2113743N22 CAP CHIP 6.8 PF + -.5PF COG 1 1 1 B Y N
5 2113743N23 CAP CHIP 7.5 PF + -.5PF COG 1 1 1 B Y N
5 2113743N26 CAP CHIP 10.0 PF 5% COG 32 1 1 B Y N
5 2113743N30 CAP CHIP 15.0 PF 5% COG 1 1 1 B Y N
5 2113743N34 CAP CHIP 22.0 PF 5% COG 4 1 1 B Y N
5 2113743N36 CAP CHIP 27.0 PF 5% COG 1 1 1 B Y N
5 2113743N40 CAP CHIP 39.0 PF 5% COG 1 1 1 B Y N
5 2113743N46 CAP CHIP 68.0 PF 5% COG 1 1 1 B Y N
5 2113743N50 CAP CHIP 100 PF 5% COG 4 1 1 B Y N
5 2113743N54 CAP CHIP 150 PF 5% COG 4 1 1 B Y N
5 2113928J06 CAP CER CHIP 4.7 UF 10% 10V 1 1 1 B Y N
5 2311049A56 CAP TAN CHIP A/P 4.7 20 10 5 1 1 B Y N
5 2409350L15 IND CER LZRETCH 22 NH 2 1608 2 1 1 B Y N
5 2409646M02 IND CER MULTILYR 4.7NH 1608 2 1 1 B Y N
5 2409646M13 IND CER MULTILYR 39NH 1608 1 1 1 B Y N
5 2409646M68 IN CER MULTILYR 3.3NH 1608 1 1 1 B Y N
5 2409646M76 IN CER MULTILYR 3.9NH 1608 1 1 1 B Y N
5 2409646M77 IN CER MULTILYR 4.7NH 1608 1 1 1 B Y N
5 2409646M78 IN CER MULTILYR 5.6NH 1608 2 1 1 B Y N
5 2409646M85 IN CER MULTILYR 22 NH 1608 1 1 1 B Y N
5 2409646M92 IN CER MULTILYR 2.7NH 1608 1 1 1 B Y N
5 2409646M94 IND CER MULTILYR 47NH 1608 2 1 1 B Y N
5 2462587P36 CHIP IND 100000 NH 1 1 1 B Y N
5 2462587Q03 IND CHIP 82 NH 20% 2 1 1 B Y N
5 2462587Q38 IND CHIP 180 NH 10% 1 1 1 B Y N
5 2609225D01 SHIELD VCO 1 1 1 1 B Y N
5 2609226D01 SHIELD VCO 2 1 1 1 B Y N
5 2609227D01 SHIELD RCVR 1 1 1 B Y N
5 2609228D01 SHIELD GIFSYN 1 1 1 B Y N
5 2609229D01 SHIELD TIC 1 1 1 B Y N
5 2609230D01 SHIELD MODEM 1 1 1 B Y N
5 4009169E01 SW ASSY DET/SMART CARD BLOCK 1 1 1 B Y N
5 4209388S01 CLIP TOP FLEX 4 1 1 B Y N
5 4809118D01 LED BICOLOR LNJ107W5PRA1 1 1 1 B Y N
5 4809277D02 XTAL OSC 13MHZ SMD 1 1 1 B Y N
5 4809527E18 TSTR NPN RF BFP420 1 1 1 B Y N
5 4809527E19 TSTR NPN RF BFG540 SOT-143 1 1 1 B Y N
5 4809527E20 TSTR NPN RF 2SC4784 SC70 2 1 1 B Y N
5 4809579E02 TSTR MOSFET N-CHAN 25K1830 1 1 1 B Y N
5 4809579E07 TSTR MOSFET P-CHAN IRF7004 4 1 1 B Y N
5 4809579E16 TSTR MOSFET N-CHAN TN0200T 1 1 1 B Y N
5 4809579E17 TSTR MOSFET P-CHAN SI9424 4 1 1 B Y N

5 4809579E18 TSTR MOSFET P-CHAN TP0101T 3 1 1 B Y N
5 4809605E02 TSTR SIG NPN 2SC4617 5 1 1 B Y N
5 4809605E06 TSTR SIG NPN AT32011 1 1 1 B Y N
5 4809606E02 DIODE DUAL ARRAY DAN222 1 1 1 B Y N
5 4809606E08 DIODE DUAL SCHOTTKEY RB715F 1 1 1 B Y N
5 4809607E02 TSTR SIG PNP 25A1774 2 1 1 B Y N
5 4809607E04 TSTR SIG PNP 2SB1132 SOT89 1 1 1 B Y N
5 4809607E05 TSTR PNP DTA143EE 2 1 1 B Y N
5 4809608E03 TSTR DIG PNP DTA114YE 1 1 1 B Y N
5 4809612F03 DIODE VCTR SMV1204-14 SOT23 1 1 1 B Y N
5 4809641F02 DIODE VCTR ABRUPT SMD SOD232 1 1 1 B Y N
5 4809641F03 DIODE VCTR ABRUPT SMD SOD323 2 1 1 B Y N
5 4809641F04 DIODE VCTR SMV1204-70 SOT23 1 1 1 B Y N
5 4809788E06 DIODE ZENER 6.8V UDZ6.8B 5 1 1 B Y N
5 4809939C08 TSTR DUAL PNP/PNP UMA6NTL 2 1 1 B Y N
5 4809940E01 TSTR NPN MRF947 A/P 2 1 1 B Y N
5 4809940E04 TSTR NPN RF NE68030 SOT323 2 1 1 B Y N
5 4809948D06 DIODE 1 1 1 B Y N
5 4809948D10 DIODE PIN BAR63-03 1 1 1 B Y N
5 5109522E23 IC SNGL INV GATE TC7SH04FU 1 1 1 B Y N
5 5109522E25 IC SNGL NOR GATE TC7SH02FU 3 1 1 B Y N
5 5109572E04 IC GAAS RF SW DPDT MS098 1 1 1 B Y N
5 5109632D08 IC CUSTOM IMPROVED PAC 1 1 1 B Y N
5 5109632D51 IC CUST BIPOLAR TIC 14SOIC 1 1 1 B Y N
5 5109632D73 IC CUST GIFSYN SILXC7786FB 1 1 1 B Y N
5 5109781E41 IC 2.7V REG TC55RP2702EMB 1 1 1 B Y N
5 5109781E57 IC LIN VOLT DECT 3V PST995MNR 1 1 1 B Y N
5 5109908K06 IC RF PA GAAS 1.5W CLASS 1 1 1 1 B Y N
5 5199281C01 IC MASK DSP MODEM SC390220PBI 1 4 1 B Y N
5 5199281C02 IC MASK DSP MODEM 2.7V 80TQFP 1 1 1 B Y N
5 8409336E01 PCB DCS RAE 1 1 1 B Y N
5 9109068E01 FLTR CER LC BP 1600MHZ SMD 1 1 1 B Y N
5 9109068E02 FLTR CER LC BP 1800MHZ SMD 1 1 1 B Y N
5 9109155K01 FLTR CER RX 1800-1900MHZ SMD 1 1 1 B Y N
5 9109179E01 FLTR SAW PB 215MHZ 150KHZ BW 1 1 1 B Y N
4 5409884J35 BAR CODE LABEL WHITE/BLACK 1 1 1 B Y N

MOTOROLA

MARKETING REQUIREMENTS SPECIFICATION – Version 2.4

MOTO/MRSDOC/GL/2.4

SUBJECT	Mobile Smart Card Terminal – Based upon the StarTAC 85 Cosmo, with 2 card readers
FROM	Laurence John – Business Development Manager, Mobile Smart Card David Gannon – Technical Manager, Mobile Smart Card Guy Lanrezac –Product Manager, Mobile Smart Card Handsets
DATE	Thursday, 31 December 1998

REVISION HISTORY

Version	Description	Author
Version D.1.0	Draft requirements Jan 23rd 1998	L. John
Version D.1.1	Draft requirements Jan 24th 1998	L. John / D. Gannon
Version D 1.1	*Draft requirements date…….....*	*L. John / D. Gannon*
Version D 1.2	*Draft requirements date……..... – Tech Marketing comments*	
Version D 0.3	*Draft requirements date 16-Apr-98*	*G. Lanrezac*
Version D 0.4	*Added Ref. Docs. And abbreviations*	*D. Gannon*
Version 1.0	Added comments on SIM selection & multi-slot management	D. Gannon
Version 1.1	Added Change Requests following May SMG9 meeting Definition of requests for Phase 1 and Phase 2 Additional request for support of Asian language	G. Lanrezac
Version 1.1	Tracking number 1.0 (no need for "Check card" prompt (STK responsibility)	
Version 1.3	• Add of target dates for Phases 1 to 4 • Update on GSM technical specification versions • Reference to specification for embossed card readers ISO 7810 & 7811 • Definition of SIM selection mechanism • Restructure of Phase 1 (Functionality, Software, MMI) • Update on Request for New Core Software Features • Reference to Flex requests for Phase 1 • Add of ZAP refresh features	G. Lanrezac
Version 2.0	• Flex off SIM selection mechanism • Support of SIM Tool Kit Command: Event Driven with no queuing	G. Lanrezac

Version	Description	Author
	• Introduction of Alex Refresh features	
Version 2.1	• Renaming of Phases 1 to 4 to Alex, Alex Refresh, Leap & Einstein • 16K SIM requested for Alex • Increase SIM ADN locations from 155- 255 requested for Alex • Increase SIM SMS locations from 35 to 75 requested for Alex • Request to not implement SIM selection via MMI until legal issues are solved • Marketing Requests for STK commands for Alex Refresh	G. Lanrezac
Version 2.2	• Definition of STK requests for Alex Refresh • Assessment of EMV card reader differences • Request to be able to flex off B slot for SIM reading capability • Request to read up to 15 characters on a 96x32 display	G. Lanrezac
Version 2.3	• Add of Status words for handling SIM data download error' STK command • Assessment of how Event Queuing should be implemented • Introduction on Leap features • Multi slot management postponed	G. Lanrezac
Version 2.4	• Introduction of Event Driven for Alex • Confirmation that only Automatic SIM selection is requested for Alex & Alex Refresh.	G. Lanrezac

MOTOROLA

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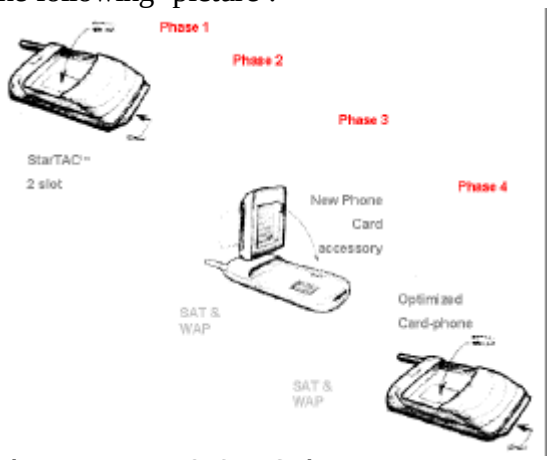
1 INTRODUCTION

This requirement document will specify functionality required by a 2 slot terminal i.e. "Mobile ATM with SIM & Smart card. Requirements should be considered in their entirety, for a roadmap and portfolio of products to be launched over the coming 2 years. Where, workload can be considerably reduced in order to launch the 1st 2 slot SMS phone by December 1998, feedback on trade-offs and compromises is requested.
In order to give a better visibility on the requirements, this document will trace the different phases of the offering illustrated by the following picture :



More information can be found on the Motorola Vision Document On Smart Cards

- **Alex (December ' 98):** The requirement concerns a StarTAC 85 (with Cosmo hardware) with 2 slots. The phone will need to support at least Class 2 SIM Tool Kit commands + dual slot change requests. The data bearer will be based on SMS.
- **Alex Refresh (Q2 ' 99):** By adding Phase 2 USSD, transactions will be made much quicker. Note: Phase 2 (with Phase 2 USSD) will need Class 3 SIM Tool Kit.
- **Leap (Q3 ' 99)** Add on accessories for Leap will need to be made available. Data inside, richer SIM Tool Kit and WAP will also need to be added.
- **Einstein (Q4 ' 99):** By this stage a product category which accepts a large SIM card (for dual slot functionality), will be defined.

1.1 RELATED DOCUMENTS

INTERNAL:

- GSM Data Bearers for Delivering E-Cash Applications to the MS – D. Gannon, Issue 1.0, 24/09/98
- MSCT Implementation strategy – D. Gannon, Draft Issue 1.0, 16/11/97

GSM TECHNICAL SPECIFICATIONS:

- 11.11 (v5.9.0, v6.1.0, v7.0.0), SIM / ME interface specification
- 11.14 (v5.8.0, v6.00, v7.0.0), SIM Toolkit specification
- 02.17 (v7.0.0), SIM functional characteristics
- Dual Slot Change Requests currently being written, these will define generic specifications for how GSM ME will use Smart Cards and interact with them via SIM Toolkit commands. These will result in changes to: 11.14, 11.11 and 02.17.

ISO

- 7816 1-9, Smart Card specifications, including Smart Card Readers, all Smart Cards, including SIM Cards should conform to these specifications, (apart from AFNOR, which we will ignore as it will be replaced by ISO from 1999)
- Specification for embossed card readers ISO 7810 & 7811

DML

The following documents are part of the DML consortium , this is formed to deliver turnkey solutions:
De La Rue – SAT SIM
Logica – Bank to SMS server, using Aldiscon for the SMS server
Motorola – Mobile Smartcard Terminal

- GSM NETWORK CRITERIA FOR STORED VALUE CARD LOAD – DML/GNCL/ALDISCON/DOC1/0.1

Required Quality of Service (Min/Max Transaction times, latency etc)
GSM Network Messaging, GSM Network Exception processing/messaging, GSM Network to Payments Systems Gateway Functions and Exception Handling, Gateway Interchange Messaging Audit Control, MIS/Reporting

Draft releases available for review by April 20th, Issue 1.0 required by 05 May, Owner: Aldiscon

- TECHNICAL SPECIFICATION FOR MST - DML/MSTTS/DG/DOC2/0.6

All technical issues for Mobile Smart Card Terminal, SIM to ME process, SVC to SIM process ME/SIM to Network process

Draft 0.6 available for review, Release 1.0 required by 05 May, Owner: Motorola

- FUNCTIONAL SPECIFICATION – DML/FS/MS/DOC3/0.1

Business Service Overview, Offline Functions, Online Functions, Main components and their functions (references to other documents for detail)

Draft issues available for release April 20th, Release 1,.0 required by 05 May, Owner Logica

- MMI LOAD SPEC (USER INTERFACE GUIDELINES)- DML/MMIS/MS/DOC5/04

Flow of transaction for MMI, Messages to be displayed, Mapping Matrix, Offline functions, Online functions, Other Functions, process exceptions (tearing, reversals), Transaction event scenarios

Draft 0.4 available for comment, Issue 1.0 due 05 May, Owner: Visa

- SECURITY SPECIFICATION – DML/SS/DG/DOC4/0.3

Overall description, Transport layer Security, Funding Account PIN/ Telecode Security, SIM Key Management

Draft 0.3 is available for comment, references to tele-codes will be removed, Issue 1.0 required by 20 April, Owner: Motorola

- TRANSACTION WALK THROUGH – DML/TWT/OS/DOC6/0.2

Detailed Walk through, Component by component description, Messages and Description, Message Exception Analysis

Draft 0.2 available for comment, Issue 1.0 required by 05 May, Owner: De La Rue
The ' Transaction Walk through' currently only addresses a positive transaction, this needs to be broadened to encompass Error Handling: Issue 2.0 required 18 May

- SMS LOAD PROTOCOL – DML/SMSLP/OS/Doc7/0.1

SIM – SMSC message protocol, SMSC – SIM message protocol, Sequencing data, Transport protocol

Draft 0.1 available for comment, Issue 1.0 required by 05 May, Owner: De La Rue

- PROJECT PLAN AND TIMESCALES – DML/PP/DS/Doc8/0.1

Detailed PP for all DML companies
Draft 0.1 available for comment, Issue 1.0 required by 20/04/98, All to provide input

- SIM / ME SAT INTERACTION – DML/MSSAT/OS/Doc9/0.1

Defines All standard SAT commands and All Dual Slot SAT commands used in the transaction Flow chart of MMI / SVC Interaction using SAT commands

Draft 0.1 available for by 20/04/98, Issue 1.0 required by 05 May, Owner: De La Rue

VISA
The following VISA specifications are available in paper form only, held by D. Gannon

- Visa International Concentration point specification, v2.1, 01/07/95 (Green)
- Visa International Reloadable SVC card Specification, v1.5, 01/01/96 (lime green)
- Visa International VISA Cash Card system overview, v N/A, 01/06/95 (dark pink)
- Visa International CAD/Service payment terminal specification, v1.0, 12/08/96 (magenta)
- Visa International Public key SVC terminal specification, v1.0, 08/96 (dark yellow)
- Visa International specification for reloadable SVC with Public key technology, v1.0, 08/96 (pale green)
- Visa International Reloadable Visa Cash Card Specification, v1.6, 10/01/97 (pale yellow)
- Visa International Disposable SVC card specification, v1.2, 01/07/95 (sky blue)
- Initialisation and Personalisation: DES based reloadable SVC, v2.0, 01/01/97 (light blue)
- VISA Cash – Planning and Implementation guide, r2.0, 03/96
- Consolidated PIN Security Standards Requirements, 15/04/95
- VISA Cash Reload Description, R1.4, 11/96
- VISA Cash Load Device Guide, DRAFT, v0.9, 11/97

DEFINITIONS

B-Slot -	Refers to the 2nd smart card slot in an ME, where large SIM & SAT applications are expected to reside.
Combi card	Combination of Contact and Contactless card.
Contact card	Chip based cards following the ISO 7816-1 8 pin layout specification.
Contactless card	Chip based cards that have no contacts and can be read using RF at distances of a few meters, mainly used in Mass Transit systems.
Memory card	Originally Pre paid, usually, telephone cards, now used for health records and vending etc., very poor security, not re-useable, hence the term, Disposable
Multi-application card	Chip based card able to run multiple applications but with a firewall between the applications, e.g. GSM SIM and Electronic purse etc. (Florida State University).
Multi-function	Chip based card able to run multiple applications seamlessly, e.g. GSM SIM and Electronic purse etc. (Not yet in production) – finance/GSM card
Processor card	The on-board processor makes the cards highly secure, many uses e.g. SIM, Cash cards etc., can have a high storage capacity.
SAT -	SIM Application Tool-Kit
SIM	Subscriber Identity Module
Smartcard -	In the context of this document this is the term for cards other than the primary SIM, usually referring to chip based a cards such as a VISACash card, or AMEX, Mondex, mass transit cards etc. All conform to the ISO smart card technical specification ISO 7816.
T=0	Asynchronous, half duplex, byte oriented
T=1	Asynchronous, half duplex, block oriented
T=2	Asynchronous, full duplex, block oriented (in preparation)

2 Alex : Preloaded mobile ATM and bank info in the hand

2.1 Functionality

2.1.1 CASE LISTING – MULTIPLE CARDS PRESENT IN TERMINAL

Tracking Number	Plug in SIM A Slot	Internal SC B-Slot	Comments
1.0	SIM + SAT		• On power-up the ME looks at the B-slot (default) and on not finding a SIM, looks at the A-slot • ME works like current GSM phone with SAT • MMI requirements will be driven by SAT
1.1		SIM + SAT	• On power-up the ME looks at the B-slot (default) ME can function as a standard GSM phone, including standard SAT operation • If B-slot commands are issued, (defined to drive SC T=1 or T=0 (finance-Smartcard) the MMI will be handled by the SAT, prompting the user to insert the appropriate SC
1.2	SIM + SAT	SIM	On power-up, the ME looks at the B-Slot (default) & operates normally (ie does not offer SAT functionality). Reference SIM selection mechanism section: (98p226) This feature needs to be flexed on / off
1.3	SIM	SIM + SAT	On power-up, the ME looks at the B-Slot (default) & operates normally and if B Slot commands are issued, perform as 1.1 This feature needs to be flexed on / off
1.4	SIM + SAT	SC T=1 or T=0	• On power-up, reference document which could create precedent to look GSM card (GSM 11.11 stated that large SIM takes precedence over small SIM): 1. Phone looks at B Slot for SIM (default) / doesn' t find, stores ATR 2. Looks at A Slot, finds SIM and powers up as phone. 3. On activation of SAT B Slot application, comms between plug in SIM and B slot ISO card commences • After initial ATR procedure B-slot card left un-powered until its participation in a transaction is requested. • On selection of a SAT app requiring the participation of a B-slot card In a transaction, the B-slot card would be powered, identity verified and addressed appropriately.

The following table resumes the different possibilities with a dual slot phone with SIM, SIM + SAT and a SC T=1/0. Two cases have been rejected :

4. Phase 1 need not consider the possibility of a multi function finance/GSM plug in card. This may be relevant in Phase 4 features.
5. We do not take into account an SC T=1 or 0 to be inserted in the Plug-in. This could be avoided by making sure that Smart cards are only ISO format for Phase 1.

Possibilities	Phase	Plug in SIM A-Slot	SC B-slot	Comments
1	Phase 1	SIM		OK
2	Phase 1		SIM	OK
3	Phase 1	SIM	SIM	ISO B slot overrides (SIM selection Phase 2)
4	Phase 1	SIM + SAT		OK as per 1.0
5	Phase 1		SIM + SAT	As per 1.1
6	Phase 1	SIM + SAT	SIM	As per 1.2 (SIM selection Phase 2)
7	Phase 1	SIM	SIM + SAT	ISO B slot overrides (SIM selection Phase 2)
8	Phase 1	SIM + SAT	SIM + SAT	Slot B overrides (SIM selection Phase 2)
9	Phase 1	SIM	SC T=1 or 0	Normal operation (no menu)
10	Phase 1	SIM + SAT	SC T=1 or 0	OK as per 1.3
11		SC T=1 or 0		Not relevant
12			SC T=1 or 0	Error message "Check card"
13		SC T=1	SIM	Not relevant
14		SC T=1	SC T=1/0	Not relevant
15		SC T=1/0	SIM + SAT	Not relevant

2.1.2 Change Requests following the May SMG9 meeting

Tracking Number	Description	Specified in GSM
98S030	Perform APDU, Power Off Card, Power on Card and Get Reader Status proactive commands	11.14
	Event Driven. Note: Phase 1 will support the card reader section. The call control section will be deferred until phase 2.	SMG (98) 99
98S021	Multi Card Reader (note: Phase 1 will support the default selection (B slot takes priority as described in 98S022).	11.11
98S022	Multi Card Reader (if 2 SIMs are present the end user does not have a menu allowing him to choose which SIM he wants to use, this will be implemented for Phase 2).	02.17

2.2 Software

The following chart resumes the main new features supported for existing & future platforms. The marketing request is to have as many features as possible for Alex.

Tracking Number	Description	8900 (modem)	StarTAC 85 (modem)	ZAP (firestorm)	ZAP refresh (firestorm)	Alex – (modem) Marketing Request
Phase II						
0151		✓		✓	✓	✓
0152	DHFA enhancement package	✓		✓	✓	✓
0127	GSM voicemail support	✓		✓	✓	✓
0145	AoC Charging improvements	✓		✓	✓	✓
0024	Auto-Read MT-SMS	✓		✓	✓	✓
0042	Seamless Power A (External power sources)	✓	✓	✓	✓	✓
0198	Headset answer on/off support		No		✓	Alex Refresh
0198	Smart Key (place/answer calls with Smart Key)		✓	✓	✓	✓
0165	Stop Call Alert with Volume Keys			✓	✓	✓
0025	Improved Call Divert	✓		✓	✓	✓
0002	Phase II MMIC/MMIS	✓		✓	✓	✓
0003	Phase II SMS	✓		✓	✓	✓
0043	Seamless Power B (DHFA)	✓	✓	✓	✓	✓
0131	Delayed Power On & Off flex control			✓	✓	✓
0004	IP-SMS management via PC	✓	✓	✓	✓	✓
0137	IP-Phonebook	✓	✓	✓	✓	✓
0082	Multiparty Calling	✓		✓	✓	✓
0166	Call Transfer	✓		✓	✓	✓
0156	Service Provider name	✓		✓	✓	✓
N/A	Support for DSP car kits	✓	✓	✓	✓	✓
N/A	Invalid battery feature		✓	✓	✓	✓
N/A	Erase Last 10 numbers when SIM is removed	✓		✓	✓	✓
N/A	Asian SMS			✓	✓	✓
N/A	SIM Tool Kit unicode			✓	✓	✓
0039	6 x SIM interface			✓	✓	✓

Tracking Number	Description	8900 (modem)	StarTAC 85 (modem)	ZAP (firestorm)	ZAP refresh (firestorm)	Alex – (modem) Marketing Request
Refresh						
N/A	16K SIM				✓	✓
0155	Increase SIM ADN locations from 155- 255				✓	✓
?*	Increase SIM SMS locations from 35 to 75				✓	✓
0115	SMS Delete all messages option				✓	✓
0023	MO-SMS reply to MT-SMS				✓	✓
0014	SMS Phone book access				✓	✓
?*	Change CLI lookup to use 8 digits				✓	✓
?*	Conference call / call transfer improvement				✓	✓
	New Quick Access items					
	Show Date				✓	✓
	Find New Network				✓	✓
	Show Credit Remaining				✓	✓
	SIM selection					Not Requested
	Eastern European Language				✓	✓
	EFR			✓	✓	✓
	EFR + HR				✓ (Q4 ' 99)	Alex Refresh

2.2.1 SIM Tool Kit

SIM Tool Kit Phase 2 with second card reader commands and event driven command (with no queuing) are requested for Alex.

2.2.1.1 SAT Menu selection

The SAT application will be accessed via a dedicated key (location is MR key of StarTAC 85) and/or the menu key and/or upon Smart Card insertion (except if SIM is active: queuing is not requested for Alex. Once pressing the dedicated key, the ME will directly display the first item of the SAT menu (not the header). Upon selection of an appropriate SAT application menu option – (select item, get input etc.) the service handler application will commence. The application will (when required) direct commands to the B-slot card, using standardised ETSI SAT B-slot commands. For a **Alex Refresh**, this selection may evolve into an ICON choice, again driven by standardised ETSI commands (currently under definition – D. Gannon contact). Note: this is a preferred choice of many customers, and available with Alcatel/ Gemplus and being developed by Siemens/G&D and D1.

Operators have expressed their preference to see a maximum number of SIM Tool Kit items on one same screen. At this point of time the ME displays one item at a time. The display of all items of a menu (up to 4 on a graphic display) will depend on availability from core products. The marketing requirement has been submitted to John Holstrom.

2.2.1.2 Event Driven

Requirement

Procedure to support display of VisaCash menu when a valid VisaCash card is inserted.
Specification
All references are to GSM 11.14, v7.0.0

ME and SIM to support:
- SET UP EVENT LIST 6.6.16

EVENT DOWNLOAD Card reader status event 11.7
There will also be impacts on TERMINAL PROFILE 5.2

NOTE GSM11.14, v7.0.0 is an unpublished specification, there are several omissions in it. The following have been identified (not exhaustive) and conveyed to the SMG9 secretary:
Annex H does not appear in the index
Normative Reference [11] GSM 04.90 (USSD), does not appear in the body of the document, perhaps it should be in 6.4.12 or 9.1.2
Icons should appear in Annex A as a letter class, Lc
Card reader status should appear in Annex A as a letter class, Lc
Card reader status should appear in the event list 12.25
Card reader status should appear Annex G as continuously reported
Card reader status should appear in Terminal Profile 5.2

Description
- ME to indicate to SIM that it supports Event - card reader status
- SIM application will set up the card reader status event in set up event list and give this to ME
- ME will note this and respond when card reader status changes, i.e. when a card is inserted
- The SIM will respond to this event by powering on the card and performing ATR
- The SIM will ascertain if the card is a valid card (is VisaCash and is not expired etc.)
- If the card is valid the SIM will react as if it had received a select item from the menu above the Visa Cash menu (or as defined by the customers)
- If the card is not valid the SIM will display the relevant text

2.2.2 Support of Asian Languages

2.2.2.1 Hardware

Up to 2M flash memory will be added to contain Asian language font data, character coding conversion data and so on. (Please refer StarTAC 100C for layout)

2.2.2.2 Unique / Key Features

2.2.2.2.1 All Asian (& selected European) Prompts

The user will be able to select any of the following language prompts in a single transceiver including Thai and Vietnamese w/ Tonal Marks.
- Simplified Chinese Character
- Complex Chinese Character
- English
- Thai
- Vietnamese with Tonal Marks

- Bahasa – Indonesia

2.2.2.2.2 All Asian SMS:

The user will be able to receive and view MT and CB SMS messages in the following languages:
- Simplified Chinese Character
- Complex Chinese Character
- English
- Thai
- Bahasa – Indonesia

A single transceiver will be capable of receiving and viewing MT and CB messages in any of the following characters:
- Complete GB13000 character set (same as StarTAC 100C). This includes all Complex and Simplified Chinese Characters of the following codes:
  - GB 2312-80
  - GB 12345-90
  - Big 5
  - CNS
  - Complex and Simplified "slang' characters
  - All remaining characters in the GB 2313-80, GB 12345-90, codes.
  - An additional 139 characters from the Big 5 code.
- An additional 140 characters consisting of all GSM 3.38 default characters plus other ASCII characters.
- Complete UCS2 Thai
- Complete UCS2 Bahasa – Indonesia

2.2.2.3 SIM Tool Kit Application Unicode support (UCS2) (planned for September in core products)

SIM Tool Kit Application should support Unicode (UCS2).
The user will be able to access SIM Tool Kit Application in the following languages:
- Simplified Chinese Character
- Complex Chinese Character
- English
- Thai
- Bahasa – Indonesia

2.2.2.4 UCS2 Phonebook (phase 1 for shipments in September)

The alpha tags will support UCS2 coding according to GSM 11.11 version 5.8.0. Please refer UCS2 Phonebook Marketing Requirement Spec for detail.

Phase1. No Chinese names could be inputed from keypad. User can enter only Latin characters.
a POS software

Air customerization) through Web page or
For sorting and retrieving of Phone Book entries, user can find Chinese phone book entry by location. Under "Find by name", all name tags will be alphabetically-sorted first. Chinese names will be listed in second section right after all name tags.

Phase 2. Advanced methods for sorting and retrieving of Phone Book entries.

User can select a telephone number from a list of
The order is based on any and all name tags that are stored in the repertory memory. The name tags will be alphabetically-sorted based on Pin-yin method. If Latin name and Chinese name' s Pin-yin are the same alphabetically-, Latin name tags will be sorted first and

For example, Pin-yin of a Chinese name will be "Chang". Another Chinese name may have the Pin-yin of "Cheng ". Then there are two English names like "Cherry", and "Charles". The overall

B. An index consist of the initials of Pin-yin of Chinese names will be added to each name tags. User alphabetically-sorted Phone Book entries. The order is based on any and all name tags will be alphabetically-sorted based on the initials of Pin-yin index. If Latin name and Chinese name' s Pin-

tags.
For example, index of initials of Pin-yin of a Chinese name " Xue Peng" will be "ZXP". Xue Yu". Then there is English names like "Zach". The overall sequence should be (1)" Zheng Xue "Zhang Xue You".

name

tag. This
could be built using this sequence field.

2.3 MMI for SIM selection

2.3.1 Purpose

The intent of this document is to state the requirements for the SIM selection user interface.

Card project may reference this document.

2.3.2 Scope

The Alex StarTAC will be the first phone to encompass the Smart Card capabilities. This includes

time. This document describes the user interface and guidelines governing the SIM selection. This

will not have the dual-slot capabilities flexed on.

2.3.3 Introduction for Automatic SIM selection

Automatic SIM selection will mean that upon insertion of the large SIM ID-000 (B slot) the ME will reboot the large SIM ID-000. Upon extraction of the large SIM, the ME will reboot the small SIM ID-1 (A slot).

2.3.4 Manual SIM selection

Manual SIM selection means that the user is offered a menu that allows him to select the SIM he wants the ME to camp on. **Until legal issues have been clarified (expected quote by legal around January ' 99) only Automatic SIM selection will be requested for Alex.**

2.3.4.1 References

[1] GSM 02.17 Version 5.0.1, Change Request A22

2.3.4.2 Definitions, Acronyms, and Abbreviations

A-Slot - Internal ME location for the ID-000 SIM.
B-Slot - Internal ME location for the ID-1 SIM.
ID-000 SIM - Refers to the small, plug-in SIM card. Also referred to as SIM 1.
ID-1 SIM - Refers to the full-size SIM card. Also referred to as SIM 2.
SCIM - Smart Card Interface Manager (Smart Card includes both GSM and Non-GSM Cards)
SIM - Subscriber Identity Module
Smart Card - Cards other than the primary SIM including VISACash, AMEX, Mondex, etc.

2.3.4.3 Overview

This document will provide the guidelines for SIM Selection and the related user interface. It will not, however, provide the technical realization of the Smart Card project including required primitives, communication between the MMI and SCIM layer, and modifications to the existing SIM event handler.

2.3.4.4 Pathname

This requirements document is located at
`/usr/global/docs/gsm/ECSD/RAE/SREQ/sim_select_ui`

2.3.5 General Description

2.3.5.1 Product Perspective

This SIM selection mechanism is a subsection of the Smart Card Project. Its success is dependent upon the implementation of the other subsections including the Smart Card external interface and the SCIM-MMI router.

2.3.5.2 Product Functions

The SIM Selection mechanism is responsible for choosing the correct SIM upon the mobile power up sequence. When two SIMs are available, it must also give the user the flexibility to immediately switch the SIM card. In addition, the user must be notified of the current card being used in the idle display.

2.3.5.3 Product Direction

Eventually, phones may come equipped with two large SIM slots or two small SIM slots making the SIM Selection a more vital role in the future Smart Card phones.

2.3.5.4 General Constraints

None.

2.3.5.5 Assumptions and Dependencies

None.

2.3.6 Requirements

2.3.6.1 Flexing

2.3.6.1.1 Default SIM

- Introduction

The phone must "remember" the default SIM card since the setting is used on power-up. Therefore, the selection must be placed in non-volatile memory.

- Storage Requirements

TITLE: Factory Default SIM Setting
ANCHOR: 0001_01
SOURCE: [2]
A byte in SEEM must be reserved to store the factory default
SIM setting. The default SIM location will be set to the B-Slot.

TITLE: Default SIM Setting
ANCHOR: 0002_01
SOURCE: [2]
Another byte in SEEM must be reserved to store the current default SIM setting. This will initially be set equal to the factory default SIM setting.

2.3.6.1.2 Extended Menus

- Introduction

Extended Menus must have a flex bit to indicate whether the feature is originally in short or extended menus.

- Storage Requirements

TITLE: Extended menus flex bits (To be flexed off for phase 1)
ANCHOR: 0003_02
SOURCE: [2]
One extended menu flex bit needs to be reserved in SEEM element 10 for the SIM Selection menu. Therefore, the SIM Selection Menu can be placed in short or extended menus, but its children cannot ("Select Active SIM" and "Select Default SIM"). This is done for two reasons: first, we only have a few extended menu bits left, and also, if there is only one child in a sub-menu, it will be "bumped"

up. This could create an undesirable menu where "Select Active SIM" would be in the Call Related Features menu options—not under "Select SIM".
Note: If SIM Selection is placed into extended menus and extended menus are off, then its menu leafs will not be visible either.

TITLE: Default Extended Menu Location (To be flexed off for phase 1)
ANCHOR: 0038_01
SOURCE: Conversation John Holstrom and Guy Lanrezac
By default, the SIM Selection Menu will be placed in the short menus.

2.3.6.1.3 SIM Selection Feature

- Introduction

Certain operators may not want the user to switch the default SIM. Therefore, the SIM selection user interface must be flexible.

- Input Requirements

TITLE: Flexing the SIM Selection Feature
ANCHOR: 0004_01
SOURCE: [2]
One bit in SEEM element 14 needs to be reserved to flex the SIM Selection user interface (including the menus, quick access, and idle display) on and off.

2.3.6.1.4 Re-Initialisation Requirements

- Introduction

Through the Master Reset option, the user can reset all phone settings back to their original factory defaults.

- Input Requirements

TITLE: Resetting the Default SIM
ANCHOR: 0005_01
SOURCE: Conversation John Holstrom and Guy Lanrezac
After the user performs a Master Reset, the factory default SIM setting will be copied into the current default setting, and the SIM menu will be returned to the short menus.

TITLE: SIM State after Master Reset
ANCHOR: 0037_01
SOURCE: Conversation John Holstrom and Guy Lanrezac
After the user performs a Master Reset, the SIM will also be reset. This includes powering down the primary SIM, powering up the new SIM, and initialising the new SIM as stated in GSM 11.11 "SIM Initialisation Procedure". In other words, this is just as if the user pulled out the current SIM and inserted a new one.

2.3.6.2 User Interface Requirements

2.3.6.2.1 Menus (To be flexed off for phase 1)

- Introduction

With the addition of the SIM Selection Menu node, the Call Related features will be modified as shown.

Call Related Features	Show Battery Meter		
	Restrict My Phone Number		
	Call Diverting		
	SIM Selection	Select Active SIM	SIM 1
			SIM 2
		Select Default SIM	SIM 1
			SIM 2
	Talk and Fax		
	Call Waiting		
	Call Barring		
	Key Answer Only		

- Menu Location Requirements

TITLE: SIM Selection Menu
ANCHOR: 0006_01
SOURCE: [2]
The new menu "SIM Selection" will be placed in the Call Related Features Menu Node. This option will be placed between "Call Diverting" and "Talk and Fax".

TITLE: Select SIM Menu
ANCHOR: 0007_01
SOURCE: [2]
The "Select Active SIM" menu option will be placed as the first menu node under the "SIM Selection" menu.

TITLE: Select SIM Menu Options
ANCHOR: 0008_01
SOURCE: [2]
When the user selects the "Select SIM" menu, he/she will have two choices: "SIM 1" and "SIM 2".

TITLE: Current SIM Menu Option
ANCHOR: 0009_01
SOURCE: [2]
The SIM currently in use will be indicated in the "Select Active SIM" menu options by a tick mark to the left of the menu option. This menu option will also be shown to the user first.

TITLE: Default SIM Menu
ANCHOR: 0010_01
SOURCE: [2]
The "Select Default SIM" menu option will be placed as the second menu node under the "SIM Selection" menu.

TITLE: Default SIM Menu Options
ANCHOR: 0011_01
SOURCE: [2]
When the user selects the "Select Default SIM" menu, he/she will have two choices: "SIM 1" and "SIM 2".

TITLE: Current Default SIM Menu Option
ANCHOR: 0012_01
SOURCE: [2]
The SIM currently set as the default SIM will be indicated in the "Select Default SIM" menu options by a tick mark to the left of the menu option. This menu option will also be shown to the user first.

- Restrictions

TITLE: SIM Selection during a Call
ANCHOR: 0013_01
SOURCE: [2]
SIM selection options will NOT be available while in call (i.e., they will not be placed in the in-call menus).

TITLE: SIM Selection Visibility
ANCHOR: 0014_01
SOURCE: [2]
The SIM Selection menu will only be visible to the user when two valid GSM SIM cards are present.

TITLE: SIM Insertion while in Call Related Features
ANCHOR: 0015_01
SOURCE: [2]
If the user is in the Call Related Features menu and inserts a second SIM card, then the SIM Selection menu will not be visible to him/her until the user exits the Call Related Features Menu and re-enters it.

TITLE: SIM Removal while in Call Related Features
ANCHOR: 0016_01
SOURCE: [2]
The "SIM Selection" menu will be visible to the user even if he/she removes the secondary SIM card while in the Call Related Features. However, if the user decides to choose either the "Select Active SIM" or "Select Default SIM" menu option, he/she will get an error message, "Feature Not Available". The "SIM Selection" menu option will disappear once the user exits the Call Related Features.

- Output Requirements

TITLE: Confirmation for Switching the SIM

ANCHOR: 0039_02
Conversation with John Holstrom and Guy Lanrezac.
If the user chooses a new SIM card for either Active or Default SIM, then they will be given the

an automatic message window using the large chicanery icon.

TITLE:
ANCHOR: 0017_01
[2]
Once the user selects a new SIM card under "Select Active SIM", the ME will power down the

Initialisation Procedure". In other words, this is just as if the user pulled out the current SIM and inserted a new one.

Result of New Default SIM Choice
ANCHOR:
SOURCE: [2]

this setting will be used the next time the user starts the phone.

2.3.6.2.2 Quick Access (To be flexed off for phase 1)

- Introduction

Since the "Select SIM" menu might not always be available to the user, the quick access feature

-

TITLE: Quick Access Icon
0019_01
SOURCE:
The Quick Access icon is shown below:

TITLE: Short Quick Access Prompt
ANCHOR: 0020_01
SOURCE: Conversation with John Holstrom and Guy Lanrezac
The short prompt for the Quick Access item will be "Switch SIM".

TITLE: Long Quick Access Prompt
ANCHOR: 0021_01
SOURCE: Conversation with John Holstrom and Guy Lanrezac
The long prompt for the Quick Access item will be "Switch Active SIM".

- Restrictions

TITLE: Selecting Quick Access Option while in a Call
ANCHOR: 0022_01
SOURCE: Conversation with John Holstrom and Guy Lanrezac

The user can still add the "SIM Selection" to his/her quick access list while in a call. If he/she decides to access it while in a call, an error message will be displayed "Feature Not Allowed".

TITLE: Selecting Quick Access Option with only One SIM
ANCHOR: 0023_01
SOURCE: Conversation with John Holstrom and Guy Lanrezac
The user will not be able to add the "SIM Selection" to his/her quick access list while only one SIM is inserted. However, if the quick access item is already in the list, then, when the user accesses it, it will display an error message "Feature Not Available".

- Output Requirements

TITLE: Result of Quick Access Selection
ANCHOR: 0024_01
SOURCE: [2]
Once the user selects the SIM Selection Quick Access item, the current SIM will be toggled. This includes the ME powering down the primary SIM, powering up the new SIM, and initializing the new SIM as stated in GSM 11.11 "SIM Initialization Procedure". In other words, this is just as if the user pulled out the current SIM and inserted a new one.

2.3.6.2.3 Idle Display (To be confirmed by legal)

- Introduction

Another mechanism must be available to make the user aware of which SIM card he/she is currently using.

- Output Requirements

TITLE: Display of Current SIM
ANCHOR: 0025_01
SOURCE: [2]
The SIM currently in use will be displayed on the bottom line of the idle display. The text will be either "SIM 1" or "SIM 2".

TITLE: Idle Display Priority
ANCHOR: 0026_01
SOURCE: [2]
The priority of the current SIM in use will be the lowest, underneath the Alternate Line Service Information.

2.3.6.3 Guidelines

2.3.6.3.1 Phone Start Up

- Introduction

The requirements listed below are general guidelines for the SIM selection upon the user powering up the phone.

- Guidelines

TITLE: Choosing the SIM at Power-up
ANCHOR: See below
SOURCE: [2]

7. When the phone is turned on, the SIM in the default location will be first selected. If it is a valid card, then it will be initialized. (0028_02)
8. If there is no card, a non-GSM card, or non-SIM card in the default location, the next location will be searched. If it is a valid card, then it will be initialized. (0029_02)
9. If there is a card in the default location, but doesn't respond to power up, an error message will be displayed "Check Card x" where x is either 1 or 2. (0030_02)
10. If an error occurs while initializing the current card, an error message will be displayed "Check Card x" where x is either 1 or 2. (0031_02)
11. If no card is found, an error message will be displayed "Check Card". (0032_01)
12. If only a non-GSM card or non-SIM card is found, an error message will be displayed "Check Card". (0033_01)

2.3.6.3.2 SIM Activity after Phone Start Up

- Introduction

The requirements listed below are general guidelines for the SIM selection after the phone was powered up.

- Guidelines

TITLE: Adding/Removing SIM after Power-up
ANCHOR: See below
SOURCE: [2]

13. If the user removes the SIM card currently in use, the phone will search the other slot and try to start the card in that slot. (0034_01)
14. If there is no card in the other slot, then an error message will be displayed "Check Card". If it is a valid card in the other slot, then it will be initialised per GSM 11.11 "SIM Initialisation Procedure." (0035_02)
15. **If the user inserts a card in the default location, the phone will automatically switch to it.**

2.3.6.4 Software Requirements Traceability Matrix

Table 1: Software Requirements Traceability Matrix

Anchor	Requirement Title	Design Document Reference	Test Plan Document Reference
0001_01	Factory Default SIM Setting		
0002_01	Default SIM Setting		
0003_02	Extended Menus Flex Bits		
0004_01	Flexing the SIM Selection Feature		
0005_01	Resetting the Default SIM		
0006_01	SIM Selection Menu		
0007_01	Select SIM Menu		
0008_01	Select SIM Menu Options		
0009_01	Current SIM Menu Option		
0010_01	Default SIM Menu		
0011_01	Default SIM Menu Options		
0012_01	Current Default SIM Menu Option		
0013_01	SIM Selection during a Call		
0014_01	SIM Selection Visibility		
0015_01	SIM Insertion while in Call Related Features		
0016_01	SIM Removal while in Call Related Features		
0017_01	Result of Select SIM Choice		
0018_01	Result of New Default SIM Choice		
0019_01	Quick Access Icon		
0020_01	Short Quick Access Prompt		
0021_01	Long Quick Access Prompt		
0022_01	Selecting Quick Access Option while in a Call		
0023_01	Selecting Quick Access Option with only One SIM		
0024_01	Result of Quick Access Selection		
0025_01	Display of Current SIM		
0026_01	Idle Display Priority		
0027_01	Choosing the SIM at Power-up		
0028_02	Choosing the SIM at Power-up		
0029_02	Choosing the SIM at Power-up		
0030_02	Choosing the SIM at Power-up		
0031_02	Choosing the SIM at Power-up		
0032_01	Choosing the SIM at Power-up		
0033_01	Choosing the SIM at Power-up		
0034_01	Adding/Removing SIM after Power-up		
0035_02	Adding/Removing SIM after Power-up		
0036_01	Adding/Removing SIM after Power-up		
0037_01	SIM State after Master Reset		
0038_01	Default Extended Menu Location		
0039_02	Confirmation for Switching the SIM		

2.4 MMI for security

2.4.1 Keypad tone suppression upon PIN entry

Part of CR change for GSM 11.14

2.4.2 Character display suppression upon PIN entry

Already active

2.4.3 Elimination of PIN taping, sniffing mechanisms &/or applications

A MSCT Security document is available: DMLV/SS/DG/Doc4/05

2.5 Flex

2.5.1 Flex for generic Dual Slot StarTAC

The flex for the core the core dual slot StarTAC can be found in the core Product Description on the Lotus Notes server. It will have the following specifics:

- Direct Access to Voicemail (Voicemail key replacing MR key as per StarTAC 150 – George)

2.5.2 Flex Barclays / Cellnet Trial

The flex for the Barclays / Cellnet dual slot StarTAC can be found in the Class C Product Description on the Lotus Notes server. It will have the following specifics:

- Specific Wake Up Graphic (in definition)
- Direct Access to SIM Tool Kit menu (Blue button key replacing MR key)
- New Quick Access order:

1. Call Voicemail
2. Read Messages
3. Vibracall On / Off
4. Find by Name
5. Phone Mute On/Off
6. Last Calls Received
7. Divert All On or Off
8. Last Call Timer
9. Restrict my ID

- Storage of voicemail number under "Message settings" to 901
- Type 1 SIM Lock to the first 5 digits of the IMSI (234-10)
- SMS CB switched by default on channel 200

3 Alex refresh: Flexible mobile ATM and bank info in the hand

3.1 Change Requests needed from the GSM specification

Tracking Number	Description	Specified in GSM
	USSD to be better adapted for Mobile Commerce (Action Daniel Ayela)	

3.2 Software

3.2.1 Main Features

Alex Refresh will support all Alex existing features. The following chart resumes the added features requested for Alex Refresh.

Tracking Number	Description	StarTAC 85 (modem)	ZAP (firestorm)	ZAP refresh (firestorm)	Alex Refresh– (modem) Marketing Request
0198	Headset answer on/off support	No		✓	✓
0198	Smart Key (answer calls with Smart Key – when connected to headset adapter)			✓	✓
	GSM Phase 2 USSD as per 04.90, v5.0.1				✓

3.2.2 SIM Tool Kit

All classes (1, 2 & 3) + all second card reader commands of GSM 11.14 version 7.0 are requested for Alex Refresh.
The following chart summarises the different SIM Tool Kit commands that are requested. They have been prioritised 1 & 2. Priority 1 is compulsory for ship acceptance , Priority 2 can be implemented as a running change.

STK command		Description	Priority
Event Download	MT Call	Server could request that the transaction does not go forward	2
	Call Connected		2
	Call Disconnected		2
	Location Status	STK could call a specific number depending on subscriber location (call this Pizza store as you ar just next door!)	1

STK command		Description	Priority
	User Activity	The application recognises that the user is pressing a specific key	1
	Idle Screen Availability	Possibility to insert a logo in idle mode (possibility to insert advertisements or corporate logos)	1
	Card Reader Status		Already Implemented
MO Short Message Control		Gives possibility to forward an SMS	1
Send USSD		Will allow faster transactions	Change Request Pending
Set Up Event List		Multiple event management	1
Timer Management		Do transaction at a cheaper cellular rate	1
Timer Expiration		Do not allow action after pre-defined period	1
Icon		Logo on display	1
UCS2		Universal 2 byte character set. This will be necessary for the Asian build. This might already be implemented in Zap refresh	
Default Choice for Getting Input		Possibility to check last bank account details, remember the latest purchase etc…	1
Default Choice for Default Select Item		A subscriber may wish to have his preferred STK service at the top of the list	1
Select Item Type Indication		SIM pre-defines types of selection	1
Extended Result			2
Status words for handling SIM data download error			2
Next Item Indicator		Completes the Personality MMI which always asks: "OK?". The prompt could be Call? For instance	1
Get Current Value of Timer		SIM asks phone how long since I asked this question	1
Extended text in display text			2
Date, Time & Time Zone		This can be included in Provider Location Information	1

3.2.2.1 SAT Menu selection

SAT menu selection can be done by 3 actions:

- Menu Key
- Card Insertion (Event Driven Command)
- Dedicated key

A marketing request has already been submitted (Venke Ayalur is aware of the issue) that the handset can automatically change font automatically to accept up to 15 characters (left justified) + automatic scrolling.

Operators have expressed their preference to see a maximum number of SIM Tool Kit items on one same screen. At this point of time the ME displays one item at a time. The display of all items of a menu (up to 4 on a graphic display) will depend on availability from core products. The marketing requirement has been submitted to John Holstrom.

3.2.3 Card Reader

3.2.3.1 EMV compliancy

At this point of time, it is clear that all T=0 smart card reader specifications will be based on EMV 3.1.1. This specification is very close to ISO 7816. After meeting world wide smart card scheme owners, it has appeared that every country seem to have some specifics that need to be added on EMV 3.1.1. In some cases 2 implementations can be compatible (for example, one scheme can ask to do a command within 3 milliseconds, and a second scheme can ask to do the same command in exactly 1.5 milliseconds. The solution would be to execute that command in 1.5 milliseconds to be compliant to both schemes).

Listed below are the main schemes Alex refresh needs to be compliant with. One software needs to cover as many schemes as possible. Any subtleties should be handled by flex. MASC (Adelaide) is assessing the effort for implementing these schemes. Once the specifics have been clearly identified, a new version of this MRS will be issued.

Scheme	Specifics	Differences
UKIS		
Cartes Bancaire		
Nets		
Gelt Kard		

3.2.3.2 SIM reader capability

It is requested for Alex Refresh that the B slot can be flexed off for SIM reading capability.

3.2.4 Other Features

SIM Copy

This feature will only be requested if the legal issue on SIM Selection has been lifted!

The following is a MMI proposal for SIM copy
The copy SIM feature will not become available until the user has inserted two GSM SIM cards. If the user is already in the "Phone Book" menu, they will not be able to see the "Copy SIM" menus until they exit out of this menu node and re-enter. In all other cases, when they go into the Phone Book features, the "Copy SIM" menus should be available.

Phone Book	Personal Numbers	Find Entry By Name		
		Find Entry By Location		
		Add Entry		
		Check Capacity	Check Phone Capacity	
			Check SIM capacity	Check Capacity SIM1
				Check Capacity SIM2
		Prevent Access	No Memory Restrictions	
			To SIM Card memory	To SIM Card 1
				To SIM Card 2
		Copy SIM Memory	Copy SIM1 to SIM2	
			Copy SIM2 to SIM1	

SIM1 is the plug in, SIM2 is the large SIM.
Error messages are to be defined when the capacity of a SIM is full.
When selecting a name via Find By Name or Find By Location, the last option would be "Copy Entry".

4 Leap : Browsing, On-line purchasing, Info-base in-hand, Bank in hand

4.1 Introduction

This phase concerns Platform Leap which has a plug-in SIM reader. In this case, the data inside, WAP compliant phone can have an accessory (illustrated by the smart battery cassette reader) which allows us to follow the Phase 1 and 2 procedure for dual slot handling.
As WAP specification has not yet been defined to date. We are creating two sub-sections to phase 3:

- 3a assumes control of Leaps data capability via SIM Tool Kit. At this point of time the definition of how a SAT can generate a data call is still under investigation and will be defined in a further issue of this document.
- 3b assumes a new architecture based around WAP and the SIM both controlling the data capability (under definition) Contacts: Doug Main / Dave Gannon. 3b will be defined in a further issue of this document.
- 3C architecture around Java and MExE is under investigation

At this point of time, it seems WAP will not be available before Q3 ' 99. The Leap team is assessing the possibility of introducing an Unwired Planed browser (Jim Filicette to confirm).
The technical team (Dave Gannon, Daniel Ayela, Doug Main) will assess how STK can co-exist with UP browser and WAP.
If necessary, this will be defined in future SMG9 meetings.

4.2 Change Requests needed from the GSM specification

Tracking Number	Description	Specified in GSM
	STK inter action with WAP and/or UP browser	

4.3 Software Features

At this point of time, the Marketing Request is that Leap supports all features supported in Alex & Alex refresh.
EMV card reader compliance will be clarified after assessment from MASC teams and dependant on future schemes negotiated in the first half of 1999.

5 Einstein : Web browsing, On-line purchasing, Info-base in-hand, Bank in hand, ticketing

Note : when inserting a SC in the handset we want to be able to read the card format on the screen (for example AMEX, VISA etc..).

5.1 Introduction

This phase concerns platforms supporting optimised smart card operating systems, GPRS, SAT, WAP and data inside. SIM cards should start having internal applications described as multi-application SC.

Java & MExE are also being compared against WAP.

As WAP specification has not yet been defined to date Software Requirements for Phase 4 will be issued in a further version f this document.

5.2 New MMI features

6 Other identified features which have not been scheduled to date

6.1 Multi-slot management

In future we will see the introduction of multi slot possibilities. The main case where it will occur would be inside a vehicle. The following chart resumes the possibilities , in bold is the SIM which takes priority at power on.

Plug in SIM (A Slot)	Large card (ISO – B Slot)	External Reader or built in car reader
	SIM	**SIM**
	SIM + SAT	**SIM**
	SIM	**SIM + SAT**
	SC T=0/1	**SIM**
	SIM + SAT	**SC T=0/1**
	SIM + SAT	SC T=0/1
	SIM	SC T=0/1
SIM		**SIM**
SIM + SAT		**SIM**
SIM		**SIM + SAT**
SIM +SAT		**SIM + SAT**
SIM + SAT		SC T=0/1
SIM		SC T=0/1
SIM	SIM	**SIM**
SIM	SIM + SAT	**SIM**
SIM + SAT	SIM	**SIM**
SIM + SAT	SIM + SAT	**SIM**
SIM + SAT	SIM + SAT	**SIM + SAT**
SIM + SAT	SC T=0/1	**SIM**
SIM	SC T=0/1	**SIM**
SIM	SC T=0/1	**SIM + SAT**
SIM + SAT	SC T=0/1	**SIM + SAT**
SIM	**SIM**	SC T=0/1
SIM	**SIM + SAT**	SC T=0/1
SIM + SAT	**SIM + SAT**	SC T=0/1
SIM + SAT	SC T=0/1	**SC T=0/1**

A new priority table will be issued for the multi-application cards in a further version of this document.

6.2 Software

6.2.1 SAT Menu Selection

6.2.1.1 B-Slot initiation (upon power-up detection)

as above but immediate upon power-up

6.2.1.2 If B-slot card has not yet been initialised

Note: this may be why there needs to be a B-slot command initiation sequence, as there needs to be a way of initialising a card that is not currently known by any SAT application.
Note: This capability is not required for Dec. 98 Trials, but is likely to be required for commercial Mobile smart card terminals, where down-loadable SAT apps are envisaged.
Action: D. Gannon to investigate how, under his currently developing architecture, PIN encryption keys would be handled, if the SAT B-slot handler app is downloaded and not pre-loaded.

6.2.1.3 Network initiation

Where the user in communication with a network service, and that service requires the participation of a B-slot card, a mechanism is required for the network to initiate a B-slot transaction. This may be via, intermediate initiation of a SAT application.

6.2.1.4 IN-CALL handling of B-slot applications

Being investigated

6.2.1.5 During B-slot applications, suitable suppression of incoming SMS alerts and displays

6.3 Advantageous features for Motorola

6.3.1 Pre-initialised B-slot card control

To be looked at for the future

6.3.2 Auto-initialisation procedure for un-initialised B-slot cards

To be looked at for the future

6.3.3 Auto-connect mechanisms for Certain Priority B-slot cards

To be looked at for the future

MEMO